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Original Contributions.

PATHOLOGICAL IRREGULARITIES.

BY M. H. FLETCHER, D.D.S., M.D., CINCINNATI. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, JUNE, 1904.

Emunciation.—The terms orthodontia and irregularities of the teeth conventionally carry with them the idea of irregular teeth in children and youth, connected with their treatment for correction. The causes are usually hereditary, but may be acquired. One could quote from writers from Etruscan days down to the present time and give the opinion of more than fifty authors, but their definitions of the etiology would most likely each differ somewhat from the other.

There have been handed down to us such explanations as "She inherited large teeth from one parent and small jaws from the other," or "His baby teeth were not extracted soon enough," or "were taken out too soon." "Lack of absorption of the roots of the temporary teeth, while the growth of the permanent set is rapid," etc. One author thinks "the development of the hind end of the jaw does not keep pace with the absorption of the front end." Then there are a lot of platitudes, such as "The teeth are too large for the jaw," "Too many teeth for the size of the jaws," "Projecting jaws," "Sleeping with the mouth open," "Enlarged tonsils," "Want of room in the jaws," etc., etc.

In summarizing the above opinions it would seem that symptoms or results have been given in place of the real cause. Nevertheless, this is only another opinion.

Etiology.—Guilford divides the causes into hereditary and acquired, and Colyer into general and local. Talbot has shown that "irregularities of the teeth are often due to two factors: those of

constitutional origin, which develop with the osseous system, and those of local origin." "The deformity always commences at the sixth year and is completed at the twelfth." "Forward movement of the posterior teeth produces the same result as arrest of development of the maxillæ. It was also shown that the vault is not contracted by mouth-breathing; that contracted dental arches are as common among low as in high vaults, and that they simply appear high because of the contraction; that mouth-breathing due to hypertrophy of the nasal bones and mucous membrane, deformities of the nasal bones, adenoids, or any pathologic condition producing stenosis, does not cause contracted jaws, but all these conditions are due to neuroses of development."

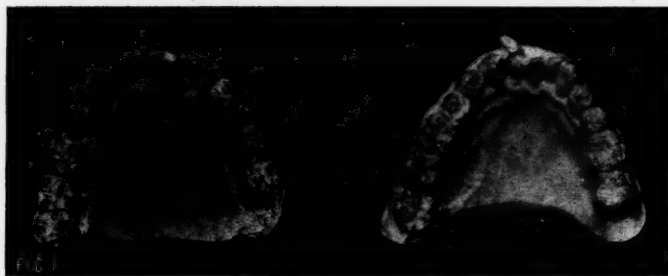
Effects.—The ill-effects of these deformities must be apparent to such an audience as this with a mere suggestion. The degree and extent of the ill-effects have not only to do with the unsightliness of the patient, but Talbot has done much to prove the connection of extreme cases with idiocy and crime. Aside from uncomeliness, irregularities undoubtedly interfere with the proper care of the teeth and gums, and in this manner are a large factor in fostering diseases of the alveolar process, including the surrounding tissues; many times involving other parts of the jaws, the nose, eyes, and ears, often inducing chronic disorders of digestion and fostering the causes of zymotic diseases. Neuroses of many varieties may have their origin in diseased alveolar process and teeth.

Treatment.—As to treatment, our best men differ in their procedures. Cleft palate and harelip are of course dealt with from a surgical standpoint. Prognathic cases, showing atavistic tendencies, with diastoma behind the cuspids, are sometimes treated surgically by removal of bone from these spaces, but such treatment is rare. In the treatment of lesser deformities mechanics are almost entirely relied on. Some operators resort to the removal of one or more teeth in order to accomplish the desired end. On the other hand, Dr. Angle says, "The best balance, the best harmony, the best proportions of the mouth in its relation to the other features, require in all cases that there shall be the full complement of teeth, and that each tooth shall be made to occupy its normal position, and if we accomplish this we have satisfied the demands of art, so far as they are concerned in the relation of the mouth to the rest of the face." To restore the features to harmony and the teeth to perfect

position and usefulness requires mechanical skill of the highest order, coupled with an esthetic sense and artistic eye.

PATHOLOGIC IRREGULARITIES.

Definition.—In contradistinction to the above, there is a class of irregularities not treated of in works on orthodontia, nor have they been considered under the head of dental orthopedia. In fact, these cases seem in a way to be "the stones which the builders disallowed." They are in many particulars the exact opposite of the others. 1. They do not appear until the age of mature years. 2. They are purely acquired. 3. They are entirely pathologic, in the sense that they are the result of disease, localized in the alveolar process.



Upper.

Lower.

Case.—Mrs. X., aged 50. Showing condition teeth were in when work was commenced in 1898.

4. They are amenable to mechanical treatment only by first removing the causes of the disease producing them.

Name.—In order to distinguish these from those previously described the writer has called them pathologic irregularities.

Etiology.—To describe all the causes of pathologic irregularities would be to give a treatise on interstitial gingivitis, known also as pyorrhea alveolaris and Riggs' disease. To make the matter plain from my standpoint it will, however, be necessary to briefly describe the anatomy, pathology, and the causes, with treatment other than mechanical.

Anatomy.—An intimate knowledge of the anatomy is of course necessary in order to comprehend the pathology, or to apply treatment intelligently. It is presumed this is understood. Now, when we consider that a hard, unyielding substance like a tooth is not

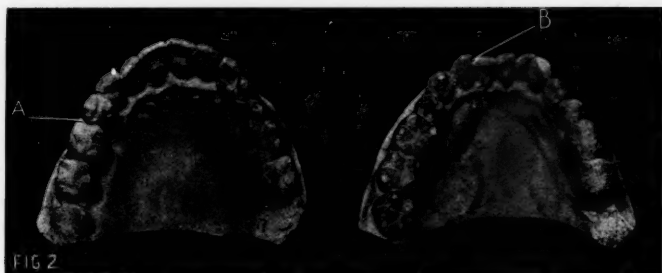
only supported and held in place by, but is entirely dependent on the thin, bony walls of the alveolar process, it is a marvel to realize what hard usage it withstands, and what enormous pressure and lateral strain it is continuously subjected to without displacement or injury. Let this bone become diseased, however, and ere long the teeth become tender and unusable, and vast numbers are finally lost without the least defect in the teeth themselves. In the last decade these diseases and their treatment have engaged the attention of the profession to a marked degree, much to its credit.

Terminology.—To Talbot is due the credit of having classified the various phases of this disease and described its different stages. He has given the name "interstitial gingivitis" to inflammation of the gums, alveolar process, and peridental membrane. The term Riggs' disease and pyorrhea alveolaris were formerly applied to any or all the stages and conditions. The term Riggs' disease is indefinite and is to-day obsolete. Pyorrhea alveolaris now indicates a flow of pus from the sockets about the roots of the tooth, and is a terminal stage of inflammatory action. It is the result of previous inflammation known as interstitial gingivitis. Inflammatory action may continue, however, and exfoliation of the teeth result without pus infection. One termination of the inflammatory action is the tendency of the teeth to be expelled from their sockets, with the result that they become elongated, tilted to one side, or pushed in or out of the normal arch. To give a plan of arresting this process before it has gone too far and to replace the teeth in their normal position is the object of this paper.

Causes.—In order to arrest or eradicate a disease its causes must first be found and removed. Talbot says, "The local causes which produce interstitial gingivitis are an accumulation of tartar about the necks of the teeth, decayed teeth producing hypertrophy of the gums, unfinished fillings, gold crowns and bridgework, artificial dentures, rapid wedging of the teeth, collections of food and everything that will produce irritation of the gum margin, setting up a chronic inflammation or gingivitis. This in turn extends to the deeper tissues (the peridental membrane and alveolar process), where it becomes interstitial in character. The constitutional causes which act locally, producing interstitial gingivitis, are the toxic effects of mercury, lead, brass, uric and other acids, potassium iodid, and other agencies acting in a similar manner, such as scurvy," etc.

He further says, "Autointoxication (meaning self-poisoning due to a faulty metabolism) is the great cause of interstitial gingivitis resulting in pyorrhea alveolaris."

In contradistinction to investigators who hold that the disease is often entirely systemic, the writer's opinion is that it must have a local cause, this cause producing a point of least resistance for the localization of systemic disorders, which general disorder or condition of autointoxication increases the local symptoms. There seems no reason to believe that drug-poisoning or other morbid systemic conditions can produce interstitial gingivitis unless a lesion of the gum preexists. This lesion may be the merest break in the mucous membrane, caused by the smallest deposit of calcareous material,



Upper.

Lower.

Same case as shown in Fig. 1, but illustrating the marked improvement effected by treatment. A—Where bicuspid was extracted. B—Where root was extracted. Both spaces closed by bringing the remaining teeth into proper position. This work was accomplished in twelve months, and it is now about six years since its completion. Teeth are still in normal position.

this local mechanical irritation being one requisite of the etiologic moment. On the other hand, there may frequently be found in gingivitis the systemic disorders accompanying cases of sapremia and septicemia.

The continual pressure against the gum tissue of rough, irritating calcareous deposits, which continuously increase in quantity and insinuate themselves deeper and deeper beneath the soft tissues, is accompanied with all the products of repair by granulation or second intention, and may be accompanied by surgical fever. These deposits may be found wherever saliva can penetrate. It has never been my privilege to see deposits of tartar about the necks of teeth that were innoxious, but they are always irritating to some degree,

and usually greatly so. This condition may exist in all stages, from that of being imperceptible to the naked eye up to a complete state of pyemia, and may result in death.

On the other hand, there is abundant evidence to show that auto-intoxication, or a low state of health from any cause, greatly favors the progress of the disease, and with this state of affairs present a chronic pus-forming condition may soon be found about one or more of the teeth where the local exciting cause exists, but that autointoxication or other systemic disorders cause this disease, without local irritation, does not appeal to the writer's reason any more than to say that the same disorders cause inflammation of the pleura or conjunctiva without a local point of least resistance from local cause.

Degeneracy or faulty development may bring the etiologic moment at a very early stage of the local irritation. This might be almost coincident with the initial lesion, whereas in normal and healthy individuals the pyorrheal stage, even in its mildest form, may be deferred indefinitely or never appear even where calcareous deposits are excessive.

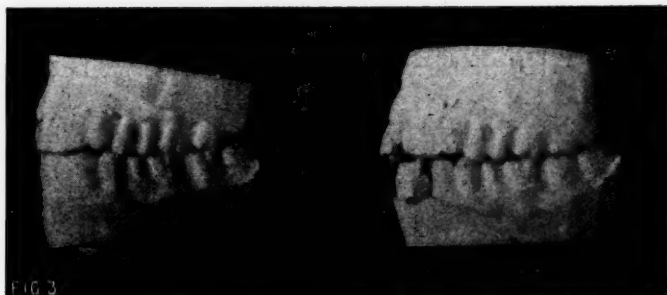
The fact that the tissues involved are transitory in nature does not seem an adequate factor in accounting for the disease, as suggested by Talbot, since they are as transitory in cases where the disease does not exist as where it does, and these tissues recover as readily as other structures which are not transitory.

There seems no question but that calcareous deposits about the teeth should be looked upon as noxious foreign bodies, and that the constant effort on the part of nature to extrude them results in the progressive death of the surrounding tissues, with the malposition of the teeth as one result. We find in this disease zones of granulation tissue with the result of destructive metabolism in the soft tissues and the creation of sequestra in the bone. This condition, however, is changed to constructive metabolism the moment the tartar, sequestra, or other local irritants are removed.

The sinus in the pyorrheal stage of this disease is between the root and alveolar process, unless the lesion be so deep in some place on the outside of the process that a gingival abscess is formed. In either event the alveolar process is continually bathed in pus, which results in its destruction. So long as the tartar is present as a foreign body the irritation is continuous and sequestra are formed

which are a second source of irritation until they are removed or absorbed.

All these cases will heal by removal of the deposits and sequestra or by the loss of the affected teeth. The removal of the teeth invariably results in recovery, and a patient without teeth, either young or old, cannot have the disease, regardless of transitory structures, degeneracy, heredity, drugs, environment, or systemic disease. If lesions of the gums or maxillary bones appear where there are no teeth, it is not interstitial gingivitis, but something else. Of all the causes mentioned the writer believes that ninety per cent



Third view of case of Mrs. X. These show the articulation after and before treatment.

of cases of interstitial gingivitis are due to hard deposits about the teeth.

Treatment.—As to treatment, I believe that all authorities are agreed that absolute removal of all deposits about the necks and roots of teeth is the first requisite to recovery. In my own hands this requires from three to ten sittings, approximately a week apart, washing out the socket each time with hypodermic syringe, using fifty per cent alcohol, saturated with boracic acid, painting the gums with iodine or iodid of zinc. They must then have constant care thereafter from one to six times a year in order to preserve a good state of health, or a "healthy stump," as surgeons say. Dr. W. A. Price has had good results by local treatment with the X-ray after having removed the deposits.

As to instruments, each one capable of doing the work will adopt his own methods and choose his own instruments and remedies for

local treatment. If the diagnosis has been correctly made the practitioner will be the judge as to whether systemic interference be necessary. If constitutional treatment is called for, abstinence from excess of nitrogenous and acid foods, with the necessity of ten to twelve glasses of pure water daily, and the addition of lithia for a period are usually indicated. Much can be learned about the condition of the system by examination and analysis of the saliva and urine; neither should be more than slightly acid and both should be normal in other particulars.

Talbot says, "In the severer types of disease, such as tuberculosis, asthma, chronic indigestion, kidney disease, etc., very little curative effect is to be expected from treatment. Constitutional treatment is tentative, since autointoxication will continue in most cases until death. The chief treatment of such cases will be removal of local irritation." "The system excretes forty ounces of water daily. If this amount be not taken into the system, or if it be not eliminated every twenty-four hours, autointoxication will follow. Every drop of water taken into the stomach enters the blood. It is one of the best purifiers which we possess. From five to seven pints of pure water should be taken each day to flush the blood and kidneys and thus cleanse the system."

Mechanical Treatment.—The causes having been determined and treatment carried well along, the malposition of the teeth should have attention, and this is usually begun before healing of the tissues is complete. The writer has had the most satisfactory results in these cases by straightening out their defects in the same manner as ordinary irregular teeth are treated. A description of the mechanical devices contrived and used for the purpose of regulating teeth would fill large volumes, yet in addition to all these the inventive powers of the operator are continually called on in carrying these cases to satisfactory completion. In my own hands cumbersome regulating appliances have largely given way to a most simple plan, namely, that of a simple bow of heavy German silver wire on the outside of the dental arch, so adjusted that the teeth are drawn to it by the use of ligatures of German silver or platinum instead of silk or rubber. Torsion is produced by putting on a band to which a tube is soldered; in this tube is inserted a spring lever, the outer end of which is ligated to the bow. The use of the bow on the outside of the arch is one of the oldest devices known, but the

manner of its handling is varied, being susceptible of a great number of uses. The resiliency of the heavy bow is such that its steady pull or push moves the teeth out or pushes them into line. Its resiliency can also be utilized to expand or contract the strongest arch. It has nearly done away with jack-screws, Coffin plates, and many other intricate and annoying appliances which were formerly used, and simplifies the treatment to a very great degree, and has done so in my hands for the past ten or more years. This bow and its accessory appliances being entirely on the outside of the arch are much less annoying than appliances inside, and are very much more effective.

It will be found that pathologic irregularities yield to pressure



Case.—Mrs. C., aged 45. In this is shown another typical case before and after treatment. At A is an artificial tooth in place on heavy platinum wire, ligated to adjoining teeth with platinum thread. The heavy wire acts as retaining appliance. This work was accomplished in five months.

more readily in older than in younger persons because of the partial loss of alveolar process, and there are no short, partly-erupted teeth to be dealt with. Regarding the imaginary difficulty of changing the shape of bones in mature adults, it may be said that live bone never becomes so old that it will not yield to continuous pressure, and teeth are more easily replaced in a former position than moved into a new one. Nevertheless, two of these cases here presented show where adjoining teeth have been brought together and occupy spaces where a tooth had been extracted or lost from disease, both in patients fifty years of age.

As to changing the shape of bones, Dr. M. H. Cryer says, "After the birth of the child muscular action and various forces have direct influence over the change of the bones, according to the following

general laws: The normal application of forces in developing bone results in the normal development of the form of the bone. The abnormal application of forces under the same circumstances results in the development of an abnormal form. Abnormal applications of forces to bone in adult life will also change and modify the shape and character."

These pathologic cases, like the others, must be retained in their new position for a period of months, perhaps for years, or until the bony arch has become thoroughly ossified again. This is usually done by ligating them with platinum wire. Sometimes a heavier platinum wire is fitted to the lingual surfaces and ligated to the teeth with the light platinum. The German silver and platinum ligature



These illustrate still another case, before and after treatment. In the first model the regulating appliance is shown in position, these attachments accomplishing the entire work. The second model depicts same case with regulation completed and teeth held in position by light platinum ligatures.

is No. 25 B. & S. gauge, as shown in the accompanying illustration.

In November, 1893, I presented one of these cases, giving this plan of treatment, and read a paper on the subject before the Cincinnati Odontological Society. Since that time I have treated several additional cases with most satisfactory results, and herewith present some of them for your inspection and criticism.

DISCUSSION.—*Dr. Eugene S. Talbot, Chicago:* I appreciate highly the new term coined by Dr. Fletcher, "pathologic irregularities" of the teeth. It is an important and common condition, and classified under this head defines the pathologic state. The tooth itself is to a great extent a foreign body in its relation to the alveolar process. The teeth, from want of antagonism, constantly move in the alveolar process, due to interstitial gingivitis. This is particu-

larly true of the old method of separating teeth by the rapid process for filling. An interstitial gingivitis was set up, because of this the teeth separated, and in later years a space resulted between them. Because of the transitory nature of the alveolar process, an interstitial gingivitis always occurs after the second teeth have obtained their position. There is what may be called an inflammatory process continually going on in the alveolar process. This is the reason why a dental arch which has lost one or two teeth is always more or less out of order. This "inflammatory process" starts an absorption of the alveolar process, because of which the teeth move in different directions. How far such an alveolar process can be restored is an open question. Some operations of Dr. Fletcher, beautifully performed, bring the teeth back into place and hold them in position until the alveolar process is restored to partial health. It is never restored to complete health. This last is a physical impossibility. Local treatment is all right as far as it goes. It is very essential that the deposits should be removed, and that the roots of the teeth should be thoroughly cleansed, but in addition there is considerable to be done in regard to draining the system. It is necessary to restore the excretory organs to their function. Autointoxication is the great determining factor, no matter what the systemic condition may be. The greatest cause of this is intestinal fermentation.

NITROUS OXID AND ITS PRACTICAL USE.

BY E. R. JACKSON, D.D.S., GRAND RAPIDS, MICH. WRITTEN FOR THE
MICHIGAN STATE DENTAL ASSOCIATION, JUNE, 1904.

As nitrous oxid in the hands of a few proves to be a satisfactory agent for producing anesthesia, yet is attempted and discarded as objectionable by many, it would seem a worthy subject for consideration. I have not made its administration a special study, but have administered nitrous oxid frequently in my practice during the past twenty years, and believe I have seen nearly all its commendable as well as objectionable manifestations. I have used it with patients of all ages, from three to eighty-five years, and with people representing nearly every condition of mind and body, and I have never lost a patient, nor have I seen a single case showing dangerous symptoms which I now believe to have been directly

caused by the anesthetic, or that might have been more favorable with a different anesthetic.

Ought we to be surprised or should we denounce the anesthetic because a nervous woman is troubled with hysteria after operating upon her in the excitant stage of nitrous oxid anesthesia? Where should we place the fault if our patient screams and fights for liberty when we attempt to operate while the sensory nerves are still susceptible to pain? Should you condemn the anesthetic which, if carried to the proper stage, is sure to protect you and your patient from such unpleasantness? Would it not be better to believe ourselves capable of error, and by the exercise of a little common sense try to do what others have done with the same agent?

The principal objection to nitrous oxid, as generally expressed, is brevity of anesthesia, and this must be admitted, yet if we improve the time as we may there will seldom be reason to complain, as most operations will have been completed before the patient returns to sensibility. Although most frequently used in extracting, this agent may also be employed to great advantage in any operation where pain and nervousness make a patient uncontrollable; excising teeth for crowns, pulp extirpation, replanting, cutting forms in very sensitive teeth for filling, lancing in abscessed conditions, or any operation the performance of which requires not more than a minute of time.

If you would succeed in any operation under nitrous-oxid anesthesia you must first ascertain just what work must be done. Examine with the view of forming a diagram of the case in your mind, as it appears in the patient's *mouth*, and never proceed with the anesthetic until this is acquired. Without a perfect understanding of the case confusion will prevent accuracy, and will so much retard the speed that the duration of anesthesia will have elapsed before the work is completed. You should not expect to operate skillfully under personal excitement, and coolness is possible only where there is perfect understanding. Select suitable instruments for the performance of the work, decide where it is best to begin, and place the instruments in position on the bracket table, so that you can reach them in their turn, as you have decided to use them. This will help to avoid unnecessary change of instruments, and consequent waste of time.

Get an idea of the temperament and general condition of your

patient without arousing his suspicion of your anxiety, and while it is well to show interest in his safety, and some regard for his nervousness, I think it unwise to question him extensively or convey to him the idea that much depends upon the heart's action. What knowledge you gain is overbalanced by his increased nervousness. He fights you and the anesthetic at the first flutter of the heart, because the importance of this has been impressed upon him. I think it is well to tell every patient something of the unpleasantness which he is sure to experience, assuring him that this need not alarm him. Advise him to take full, quick breaths, and to exhale forcibly, as the inhalations and exhalations will be more uniform and the liability of cessation of respiration will be lessened.

After beginning the anesthetic say nothing, and allow no one else to speak to the patient or to you. He cannot understand clearly, and his effort to retain consciousness retards anesthesia and exhausts him. Never advise a patient to hold the hand up, to move a finger, or anything that will require an effort on his part, or give him an idea that you depend upon him to inform you as to the stage of anesthesia. You cannot safely rely upon such proofs, and must decide by the sound of breathing, and the absence of sensitiveness of the conjunctiva long after he would be unable to move a finger. This is the most trying moment for the operator. Upon your management depends your success and the patient's safety. You are about to begin the work the success of which is not certain, and the result of your effort can be known only when you have finished. To carry the anesthesia to the point where the best result is possible, at the risk of a human life given to you through confidence to protect, is by no means a nerve tonic, and to lose sight of the fact that there is always danger at this time would breed carelessness, which has no place in this work.

With nearly all patients it is safe to carry the anesthesia to a degree where the muscles relax, but this requires the most careful attention to the patient's condition, and is not advocated by any one whom I have known to discuss this subject, as it is generally believed to be unsafe. If the patient has been allowed a breath of air occasionally during the administration, and symptoms of lividity are absent and the respiration uniform, I believe it far better to continue to this point than to attempt the work while the muscles are rigid. I learned this in the hospitals, where for surgical work in

one case I continued the anesthesia over a period of thirty-five minutes, in which I was compelled to keep the muscles relaxed. I have administered nitrous oxid in a hospital in Grand Rapids for surgical work on several occasions with perfect success, and the patients were in most cases revived within a minute after the work was completed.

In all ordinary cases I use nothing but cold water in the face to revive a patient, yet it is always well to have within your reach proper resuscitants. A hypodermic syringe containing 1-50 of strychnia, a respiratory excitant or a cardiac stimulant, as amyl nitrite, nerve-quieting remedies, bromid of potassium, etc., and to understand and employ without delay the proper methods for artificial respiration in case of cessation, all are necessary. Always use a mouth prop unless the teeth are all removed from one of the maxillaries. It is especially convenient in events where the tongue, after anesthesia, is drawn back over the glottis and closes the air passages so that it becomes necessary to thrust the finger into the throat to recover it. A pair of tongue forceps should be kept conveniently by for such emergencies.

I never administer nitrous oxid with the clothing tight about the body or neck of the patient, nor except in the presence of an assistant or third person. Use nothing but liquefied gas. Test the apparatus to see that it is in good working order immediately before using. Keep cool and remember what you have to do.

OFFICE MANAGEMENT.

BY HENRY C. RAYMOND, D.D.S., DETROIT. READ BEFORE THE MICHIGAN STATE DENTAL ASSOCIATION, AT LANSING, JUNE 28-29, 1904.

My treatment of this subject is of course largely from the standpoint of a city practitioner, whose ideas differ somewhat from those who practice in villages or small towns. The basis of successful office management, however, should not vary greatly in any practice, and that management which is successful in conducting a city practice will in a modified degree be equally successful in practices outside the cities. Under the head of office management would naturally come the use of an assistant, the disposal or allotment of time, first for operations, second for treatments and consultations, and on the commercial or business side the bookkeeping and collection of fees.

I will first speak of the assistant, as it is almost impossible to have any kind of management without one in a city practice. In most cases a girl or a young woman is far preferable to a man. I am, of course, not referring to a bench or chair assistant. A girl as a rule is more obliging and willing, is neater, and in nearly every way better adapted for such work. She should be as well educated as possible, and write a good hand or be able to use the typewriter. She should be intelligent and neat in person and dress, and cannot be too big a crank in cleanliness to suit me. She should have a bright, cheerful disposition, as we have enough to ruffle us in a day's work, without having someone around who is sulky or morose. It helps wonderfully to have someone in the office of a sunny temperament. My assistant looks after the entire dental outfit, keeping everything, especially the instruments, absolutely clean, sees that instruments, etc., are always in the same place, so that there may be no time lost in looking around for anything when it is wanted. In a busy practice time is precious, and every moment must be conserved, besides our work moves along more smoothly when order prevails around the chair. I sometimes wonder how some men accomplish anything, when I see the topsy-turvy condition of their operating rooms. It is the assistant's duty to see that the stock is kept up, so that there may be no running to the supply house just when things are wanted, except it be for teeth. She attends to telephone calls, and sees all patients when they come in, and makes most of the appointments. She also keeps the records of operations and charges, and sends out the bills and receipts, and assists at the chair or bench in any way to facilitate the work and save time.

A professional man's time is largely his capital and this is especially so with the dentist. Having to apportion out our time, as we must for the different operations, the careful arrangement of the work to be taken care of each day is very important, and any measures we can employ to utilize our time in the most profitable manner should be taken advantage of. In fact, I know of nothing more important in the management of a dental practice than the intelligent and careful mapping-out and arrangement of the day's work. In a city practice, with one patient closely following another, two chairs are a great aid in utilization of time, even if they are both in the same room and only separated by a screen, though of course it is better to have the chairs in different rooms. While I have a regular

hour for treatments, etc., which I shall speak of later, there are occasionally patients who require immediate attention, and such cases I attend to in another room, shut off from the main operating room, and having a separate entrance from the reception room. This second operating room is very useful in many ways and I frequently leave a patient there after setting an inlay, for the cement to set, while I start work on the next patient in the other chair. I also use this second room when taking impressions, and instead of waiting while the assistant cleans up the plaster and makes things presentable I can go right to work at the other chair. It is a good plan to have duplicates of those instruments that are in frequent use, such as mouth mirrors, explorers, scalers and some of the excavators. One set is always clean and ready, and when the soiled ones are removed may be brought in all ready for use. This saves much waiting, and averts the possibility of the assistant not properly cleansing them, as is not unlikely, when we are waiting for the instruments to go on with our work.

One very important item in the saving of time is the careful making out of a chart at the first examination of all the operations required, even if it be only one tooth, for it may be a week or more before the patient comes again, during which time many mouths have been worked on, and except in cases of wonderful memories it is not easy to remember the next time we see the patient which tooth or teeth required attention. There is a great deal of time lost in aimlessly looking around the mouth for the work to be done; sometimes the patient kindly points it out, but we should have our chart before us, then what is required can be seen at a glance, provided, of course, that each operation is carefully checked off when completed. My assistant watches the appointment book, and has the patient's chart laid out before the chair is taken.

All-important in the management of a practice is the care used in making appointments for operations, the arrangement of time for treatments and consultations, and avoiding interruptions. Engagements for operations should be made with the idea in mind of what we expect to accomplish at a given visit. In other words, we should endeavor to map out the work in advance for each patient as fully as possible. I know it is not always possible when making an engagement to exactly time the contemplated operation, and perhaps it is better to be a little liberal in the allowance rather than err in

the opposite direction, for if the operation does not quite take up the allotted time there is frequently more in the same mouth to be done, or if not, the spare moments can generally be utilized in many ways before the next patient appears. In any case it is better than keeping a patient waiting too long, as we are apt to do if sufficient time is not reserved for each operation. The more punctual we are in seeing our patients at the appointed time, the more punctual they will be in keeping their engagements. Then, too, while some men are not affected by the knowledge that a patient is waiting, there are some who are apt to hurry through with the work in hand and not make the operation as perfect as it should be. I might say in this connection that if you have one or a dozen patients waiting in your reception room, *forget them*, and concentrate your mind and energy only on what you are doing. Such a course will be a time-saver in the end, for your work will not then likely return a failure. The day's work through will run more smoothly and more will be accomplished if the appointments are so arranged that one patient follows another with little or no waiting. A half hour lost with one patient is hard to make up and frequently disarranges the day's program, so we must ask for punctuality from our patients, and encourage it by being as punctual ourselves as possible.

I speak strongly for method in our practice; it will make our work much easier and we will accomplish much more. Some men see patients at almost all hours for consultations and treatments, or will even leave the patient with the rubber-dam on to talk with an agent. There is no method in this practice, and patients get tired and sometimes indignant at such treatment and neglect. I think it best to set apart some hour of the day for consultations and treatments, say between the hours of twelve and one, or between four and five. It is understood by my patients that my hour for treatments, changing wedges, consultations, etc., is between twelve and one, and if they cannot come at that time they generally come by appointment. I very seldom leave a patient I am operating for, except it be to give relief to one in pain. During long operations our patients may occasionally be glad to have us leave them for a few moments for a rest or slight relief, but as a rule it is best to stick as closely to your operation as possible, without allowing interruptions to take you away; by so doing you will not disarrange your mapped-out time, and you will be apt to do better work. Concentration on what

one is doing is very essential for success, and this is almost impossible if we leave the chair frequently. An intelligent assistant will stand between us and unnecessary interruptions. I rarely leave my chair to see a patient who has not an appointment. In nearly all cases my assistant makes an appointment with them before they can see me. Regarding agents or others who do not wish to see me professionally, they must send in their name or card so that I may know who they are and what business they wish to see me on. If I am interested an appointment is made at an hour which will not interfere with my work, and if I am not interested they are told so and are not wasting my time and their own by useless persistence.

At the first examination note carefully what is required to put the teeth in the best possible condition, considering the best means to bring about such a result, and after carefully mapping out the method and means to be employed, try and adhere to them as closely as possible. In other words, use method and don't go at any work slipshod, doing an operation here and there, not knowing what you are going to do next. Much more can be accomplished in a given time when we are systematic.

Regarding the breaking of engagements by patients without due notice, to my mind there is nothing more demoralizing in practice, and it is generally understood by my patients that failure to keep an appointment for operations, without timely notice, means that the lost time will have to be paid for. Such information is printed on my appointment cards, and it is closely lived up to. Of course there are at times extenuating circumstances to be taken into consideration, and sound judgment must be used; but laxity in this direction is a mistake, and we find as a rule that our patients value our time in about the same ratio as we do ourselves.

A few words now on the business side of our profession, namely, that of keeping records of operations, rendering bills and collecting them, and I cannot refrain from saying here that many of us make a very poor business of it indeed. If we do not see that we are paid for our services, and that, too, with some degree of regularity, how can we hope to be successful? If we are not paid for our work, how can we pay our own bills, and keep up our good standing in the community in which we live? A dentist who pays his bills promptly, and does not have debts continually hanging over his head, is in a much healthier state of mind generally, and much better fitted to cope with the daily difficulties of life.

The simpler our method of bookkeeping the better. My accounts and records of operations are kept by the card system by my assistant. I keep a day-book or journal in which are entered the day's work, credits and debits, from which book the ledger card system is made up. By using the card system we obviate the handling of a bulky ledger, and also avoid having to look through perhaps several hundred pages monthly to find the unpaid accounts. There are three sets of cards, each of different color, alphabetically arranged, one color for unfinished operations, one for finished operations which have not been paid for, and one for paid-up accounts. All that is necessary at the end of the month is to look through one set of cards to get a full list of those whose work is finished but for which payment has not been made.

Bills are mailed once a month. That is, a bill is sent the first of the month following that in which the work has been completed, and payment is requested by the fifteenth. If no notice is taken of the sending of a second or third statement I call attention to it and ask for payment, though we must use discretion in this as in anything else. I can see no reason for allowing an account to run along indefinitely before rendering a bill, nor can I see any reason why reasonably prompt payment should not be requested after the bill is rendered. If we are lax in our methods of sending out statements, and seeing that they are paid within a reasonable time, we will soon find our patients just as lax on their part. Then, too, when a bill is rendered promptly the extent of the work with its difficulties, etc., is fresh in the patient's mind, frequently accompanied by gratitude for the service rendered, and payment is promptly and willingly made, whereas if several months elapse before the bill is sent only a dim recollection remains of what has been done, and the bill at that time may look large. Remember, old bills are always the hardest to pay and to collect. I do not render any itemized statements unless requested to do so, which is very rarely the case. The statements say only "For professional services from such a date to such a date." The patient is not much wiser as a rule for receiving an itemized statement, and to me it takes on somewhat of a commercial transaction, rather than a professional one as it should.

I can hardly close without again referring to the need of being punctual in all our office affairs, not forgetting that good business methods are not to be despised because we are professional men.

We must not forget that the building up of a good practice and retaining it are accomplished only by faithful, conscientious work, and close and careful attention to the many little things that make for successful office management.

DISCUSSION.—*Dr. L. P. Hall:* I would emphasize the suggestion of sending out statements regularly and promptly. I have often had trouble in collecting fees when I delayed rendering the bill so long that the patient had forgotten the character of the service and thought an over-charge had been made. Whereas had I sent the bill while his memory was clear on the matter he would not have demurred or questioned it. It is a good plan also to make a memorandum on the ledger every time a statement is sent out, and to inform the patient to whom several bills have to be sent of the dates when former bills which are still unpaid were sent him. It begets confidence as to accuracy, and is apt to induce the patient to do likewise.

Dr. E. T. Loeffler: Some dentists seem to think it is a good plan to have the office always full of waiting patients, but I never could feel that I had any right to use up my patients' time in this way. Of course times will occur when patients are unavoidably kept waiting, but they should not be encouraged to think that they can come in and interrupt you when you have agreed to give your time to someone else. It is also bad practice to keep patients who are suffering waiting while you gossip or delay with matters which may easily be postponed. A little thoughtfulness and tact will enable one to keep the office clear and the work running smoothly and continuously.

Dr. H. K. Lathrop, Detroit: I do not hesitate to send statements to my patients at the first of the month or any other time, nor to render statements at the beginning of the month, even if the work is still incomplete. It may seem like commercialism, but there is no reason why it should not be done. The character and bearing of the assistant is a very important matter. She stands between the operator and the public and saves him a lot of annoying visits, and if she is tactful and knows her business she will often save her wages in a day. I think these girls are very often repulsive or at least objectionable because of their personal appearance. They frequently are either overdressed or untidy, and one is about as objectionable as the other. I have seen a girl in a dental office dressed

as though she were going to a party. This is as bad taste as though she were untidily dressed. Appropriately dressed and of affable disposition, she can be of great help.

Dr. Wood: I am accustomed to sending my patients an itemized statement of account, and never knew of one objecting to it. I even go further and inclose a marked chart. I send my statements when the work is completed, whether it is in the middle of the month or the first day.

Dr. Hildreth: We get our bills the first of each month from business houses, and it has become so customary that it seems a proper time to render bills. It is when salaries and wages are paid, and most people would like their bills at that time, so they can pay them with the least bother.

Dr. Spring: I have a method of inducing patients to pay at once. As each operation is completed I mark it on a chart and ask them to hand it to the assistant, who is seated at the desk and prepared to take payment. The patients will either pay or arrange a time for the payment. This saves bookkeeping and makes collections more prompt.

Dr. N. S. Hoff, Ann Arbor: The character of an assistant is vastly more important than her dress. As Dr. Lathrop has said, she must stand between the dentist and the public. In order that she may do this she should know the business thoroughly and also how in the best possible manner to meet and dispose of people who come to the office. She must have a high order of intelligence, be gracious and tactful, and have a deep interest in the affairs of the office. Such an assistant will be able to make appointments, receive and dismiss patients, or entertain them while waiting. She can also keep books and collect fees and do any other routine business. With proper training she can be very useful at the chair, keeping instruments and other appointments in order and ready for instant use, and there is no reason why she may not keep cutting instruments sharp and ready for use. It is not impossible to have an assistant who can perform some of the simpler operative procedures. It is not to be expected that an assistant who is able to do all these things well can be employed at a small salary. She should command good pay and be thus encouraged to increase her usefulness. The more intelligent, the more profitable she will be.

REGULATION OF FEES.

BY PERRY F. HINES, D.D.S., LAKE ODESSA, MICH. READ BEFORE THE
MICHIGAN STATE DENTAL ASSOCIATION, AT
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One of the most important questions confronting our profession to-day is that which relates to professional remuneration. At the present time there seems to be a disregard for a uniform and systematized basis upon which to compute professional fees. Fees are of necessity to be regulated somewhat by the community, the quality of patronage and the prices usually charged by other dentists in that locality, and thus compensation may vary somewhat in different localities; but in every community there will be found at least one dentist who receives better pay, more appreciation for his work, lives better and seems to enjoy life more.

It should be the duty of every dentist, locating in a new practice, to call upon the resident dentists of that and neighboring towns and ascertain as nearly as possible the fees received by them for the various dental operations performed in everyday practice. The resident dentist should also feel it his duty to be frank and inform his prospective competitor of his manner of doing business and the fees which he commonly receives for operations.

After the incoming practitioner has by careful inquiry ascertained as nearly as possible the fees received by his competitors, I would strongly advise him to earnestly strive to give strict attention to his professional duties, and if possible do as good or better work than any of them. Then for the services rendered he should demand a fee equal to or greater than that received by any one of his competitors. By so doing he will receive better appreciation of his work, gain the confidence of his patients, and thus raise himself in the estimation of the people in the community in which he practices. The receiving of a good fee should be an incentive to him to be more painstaking, to give more time to the work in hand, and thus render to his patients the highest degree of skill within his capability.

He may argue to himself that he cannot demand such fees as Dr. Jones or Dr. Smith, who have been in the place for some time and have built up an established practice, but I wish to say that he *can* and *should* from the very beginning demand such fees, providing he renders equally good services. He must not expect that in the

beginning he will be kept as busy or have as many patients call at his office as those men who have become well established in practice; but someone will call upon him to perform some professional duty. This is his chance, his opportunity to demonstrate his ability, and no matter what or how trivial the work may be, whether it is the extracting of a tooth, the insertion of a gold or an amalgam filling, or simply cleaning a set of teeth, he should perform the operation painstakingly and to the very best of his ability. This patient will be his living, speaking advertisement. We should remember that every person has a friend and some have many friends, and thus when we have performed an operation of real merit, and it is appreciated by that patient as such, because of its being so and of his having paid a good price for it, we cannot tell how many more of like character may be attracted to us.

It is the duty of every practicing dentist to spend a part of his time in educating his clients up to a higher appreciation of dentistry, to give them a clearer insight into the necessity and the manner of preserving the natural dental organs, and the causes which determine the amount of a fee charged by qualified men.

The ability of the dentist is the true standard by which the question of fees should be determined. It is a dentist's duty to charge well for his services. It is a duty, because good fees compel good services. Good fees show an appreciation of the dentist's work. They are an incentive to the dentist to do better work, if it is within his power to do so, and to maintain this as a standard of excellence; an incentive to ambition and superior effort, because in accomplishing something he is sure of an increased appreciation, evidenced by good fees for good work. A dentist cannot afford to render good service at a poor price, and he cannot afford to render poor service at any price. By this I mean that whatever the operation he undertakes he should perform it to the best of his ability.

While it is possible for each dentist to maintain a nearly uniform standard of fees, it is not possible to perform for all a uniform grade of work, for, as Hambly says, "In considering this question of compensation it is necessary to remember that the interests of the patient should be paramount to every other consideration." For instance, suppose a poor man earning a dollar and a half a day, and having a family to support, applies to us, and we find him suffering great discomfort from an aching tooth. We know that the tooth

could be saved, provided we removed a gangrenous pulp, cleansed the tooth, gave it several treatments, and filled the roots. Now we might like to advise him to have the tooth so treated, but we realize that this would be expensive to the man, would not at once palliate his pain, and would necessitate his losing time. In justice to him, and in consideration of his limited means and the imperative need of relief, in order that he might pursue his duties without loss of time, we would extract this tooth and so give relief at once at the least possible expense.

If, on the contrary, the patient is a man perfectly able to pay any reasonable fee, whose knowledge of the importance of the teeth is such that he values them most highly and looks with suspicion upon the dentist who would suggest the advisability of removing such a tooth, then we should undertake to save it if there is any possible chance of restoring it to health and usefulness. Here the dentist must use his highest skill, no matter what the expense may be; this patient has the time, the money, and the personal inclination, while the other cannot afford either the time or money. Thus, by saving the rich man's tooth we do what is best, and by extracting the poor man's tooth we do what is best for him from every point of view. Uniformity of price cannot therefore be maintained without taking cognizance of the quality of the clientele.

In estimating the fees on service to be rendered sound judgment must be used, and if any great amount of work is to be performed the dentist will act wisely if he explains to his client somewhat in detail what is necessary to be done and the probable charge that will be demanded, so that the latter may be prepared for the payment of such fee, and thus avoid unpleasantness when the time comes to pay. This plan should be adopted whenever any amount of work is to be performed, unless you are acquainted with your patient and know that the amount of the fee is immaterial to him. An intimation of what the probable charges will be is often a great help in the adjustment of accounts, as it leaves the patient open to make suitable suggestions and gives the operator a better opportunity to learn the desires of the patient and his financial ability, besides removing the possibility of any charge of unfairness when the work is finally completed.

After having carefully examined the work to be performed in any case, and having given an estimate of the probable charge, never

haggle or lower such estimate when told by patients that they can get the work done more cheaply. Explain to them briefly that the time and skill you purpose to give them will be worth all you ask, and that while you would be very glad to serve them, in your practice you could not afford to do the work for less money. You will find that the people who are always trying to beat you down on price are shoppers, individuals who sometimes fabricate and are trying to get something for little or nothing, or are endeavoring to obtain skilled service from you at the price of the unskillful. They are often fault-finders, and you will in most instances be fortunate if they never enter your office the second time.

DISCUSSION.—*Dr. F. H. Essig, Dowagiac:* In our city we recently passed through the experience of competition on the fee question. A new dentist advertised lower fees than were customary, and a considerable number of the other practitioners combined in a public advertisement to meet the cut. The contest continued several months and resulted disastrously to all concerned, and it will be a long time before the profession recovers from this error of judgment, if it ever does. The community now thinks that the cut fees were about right and doesn't want to pay more. In regard to having fees based on ability of patients to pay, I think we are justified in charging patients who are able to pay full fees, because we have so many patients whom we must serve that require oftentimes expensive treatment and yet they can't afford to pay even moderate fees.

Dr. Wood: It is a good plan to have one's fees higher than one's competitors, not for the sake of personal aggrandizement, but because it stimulates one to render better service than his competitors. We unconsciously fit our work to the fee we expect to secure for the service. It is better to perform the service and then make the fee on the basis of its value. We are not likely to give the poor man our best service, because we do not expect compensation, and we naturally give the rich man the best we can do, because we value his patronage and know he can compensate us. I don't, however, think it is fair to charge a rich man for a poor man's service. I don't allow competitors to influence my fees, but do the best work I can for each patient and if possible get the fee that affords me satisfactory compensation. The greatest trouble with this method is that you cannot always, in justice to yourself, tell patients the expense of a service before it is rendered.

Dr. Fowler: As a rule dentists try to get compensating fees. I do not think the dentists of Dr. Essig's city did right to try to down the man who came in and cut the fees. It is difficult to correct a crime by committing another. The dentists should have stood with Dr. Essig, and the confidence the community had in them as honorable practitioners would have made itself felt before long, and the fee-cutter would have found his business unprofitable. Several good communities in this state have been almost ruined by this kind of a procedure, so far as anyone ever being able to again practice legitimately and honorably in them. I should like to see this Association take some action that would serve to influence its members to do right when such a crisis comes.

Dr. M. T. Watson: As a practitioner of a specialty I find that we have the same difficulties to meet, in fact, I presume there is more shopping in my line than in that of the general practitioner. I can't agree with the speaker who would have the rich patient pay the poor one's bills. Such an action would make us only a means of extorting charity from unwilling benefactors. When I make a concession on fees I am very sure that my patients so understand it, and I would certainly never lead my rich patients to feel that they had paid some poor man's bill. When I give charity I want to do it so that I shall benefit my own conscience.

Dr. Douglas: It has always been my policy to strive to do my work as well as I possibly could, and better than any competitor. I have cultivated this ideal so that it would be a strong temptation that would cause me to slight my work because I was not getting as large a fee as I thought it worth. To those able to pay we should charge a full fee, but not an unfair or exaggerated one, and when the poor or unfortunate come for service do the best we can to meet their limitations. It is true that some patients who can pay good fees will not, and they are the perplexing ones, and will often try our patience. I make my fee on a standard of my own appreciation of the value of my time, and when it is necessary, discount it always with the patient's knowledge. I have often given the whole of a valuable service to a patient, but that I have counted as a pure benevolence. Where we have an intimate acquaintance with our patients there is no reason why we should not be able to adjust fees equitably.

Dr. Snyder: In large cities and almost everywhere in Europe

dentists charge by the hour, while it seems to be the plan in this country to charge by the piece. The colleges are graduating so many dentists every year that every community in this country has more dentists than can make a living. In Sweden the number of dentists who may practice in a community is limited. Where we have six or eight dentists they would not have more than two. Therefore, for lack of sharp competition, they can more easily maintain a level standard of fees. It would be a good plan to limit the number of dentists in this country.

Dr. L. P. Hall: In the old countries where the number of dentists is limited the amount of services is consequently limited. I recently visited England and I never saw so many people with bad teeth. I met a dentist over there who told me of a city with sixty thousand people living in it which had only two dentists. Such a city in this country would keep at least fifty dentists busy. The custom over there is to let the teeth go until they are irretrievably lost and then extract them and perhaps put in a plate. Decay of the teeth is considered a disease which must run its course, without attempt to interfere. The masses are not educated there as here to care for the teeth, and it seems as though the profession does not care to have them enlightened, since the laws prevent dentists from other countries going there to practice.

Dr. Wood: I am glad I live in a free country where a man's success depends on his own ability. Any dentist who has taken the care to properly prepare himself and can't find patients enough in this country to make a living, ought to get out of the business and take up something more to his liking or in which he can succeed.

Dr. N. S. Hoff: It is not equitable in every case to charge the same fee for similar services. It is worth more to work for some patients than for others. It is worth more to serve a nervous, irritable or petulant patient than it is one who controls himself and does not exhaust the operator. It is not possible to make a set of teeth for every one for the same fee, as some cases are easily fitted and others with great difficulty. This latter fact is probably one of the most important reasons why most dentists do not make artificial teeth. The fee for artificial teeth has come to be established, especially in small cities and towns, on a basis of what the cheapest man in the town is willing to charge. A good operator can't afford to give the time necessary to give the best results at the prices people

think are proper, and so this work has fallen to the hands of cheap men and consequently is cheap.

VITAL ACTION OF THE DENTAL PULP.

BY R. R. ANDREWS, A.M., D.D.S., CAMBRIDGE, MASS. READ BEFORE THE
SECTION ON STOMATOLOGY, AMERICAN MEDICAL
ASSOCIATION, JUNE, 1904.

Several years ago I had the honor of reading a paper before this Section on "The Embryology of the Dental Pulp" (DENTAL DIGEST, August, 1902, p. 658). That paper gave a minute description of the various processes taking place during the development of the tooth from its formative pulp. I purpose in the present essay to consider the nature of the mature pulp, and to call your attention to its vital action after the tooth is formed. I shall consider the pulp within the pulp-chamber and its myriad fibrils, for these fibrils are as much a part of the pulp as any portion of it, and are the channels by which its vital functions are carried on. These canals are slightly undulating, and radiate from the pulp-chamber to the outer surface of the dentin. Each canal contains a fibre bathed in a fluid, and this fibre is an arm of the pulp. Branches from this fibre anastomose with others through the dentin matrix. They form a delicate network in the substance of the crown near the enamel. In the region of the cementum they anastomose with the fibres of the granular layer of the root. When the tooth is fully formed the principal function of the pulp is for the vitalization of the substance of the dentin by means of its fibrils, which permeate into every portion of the matrix of the dentin. Its function is not only to vitalize, but it may again assume its formative function whenever causes for repair demand this action.

One of the difficulties we find in our research work on the mature pulp is the fact that we can not look on its tissue in life. We can not see these vital processes while they are going on, but must make our deductions on freshly-extracted normal teeth and pulps that are as near the life period as possible, but it is always dead tissue that we have to examine. We draw our conclusions from what is shown to have taken place when the tissue was alive; we know that the living pulp, with its blood-vessels and nerves, nourishes the dentin; that vital changes do take place, and that this pulp is the

source of vital action. It is a living organ, subject to any physiologic or pathologic process which may act on any living matter; therefore we may expect to find its connection with the general economy similar to that of other tissues. It will respond to the action of returning health, and caries which has commenced has been arrested by this vital action. It appears as polished blotches on the teeth and is not uncommon. Miller, in his work on "Microorganisms of the Human Mouth," calls this condition a spontaneous healing of dental decay. The dentin, which had become softened, has become hard again, and the decaying process is stopped. This change also takes place in the temporary teeth. The healed dentin retains its discolored appearance, but becomes nearly as dense as normal dentin. These changes have been brought about by vital action, and this action came from the agency of the pulp.

The histologic structure of the normal pulp, at the time of the full formation of the tooth, as has already been described in a former paper, is as follows: At the periphery we have the pear-shaped cells, then the spindle-shaped conjugation layer of cells, then the spindle-shaped and irregularly-shaped cells with their anastomosing processes, and lastly, the connective-tissue elements in the central portion of the pulp, which seem to be scant in protoplasm. These cells are not very numerous and are in a jelly-like matrix. The blood-vessels enter at the apex, the trunk-vessels resting near the centre of the pulp. Sometimes as many as three arteries are seen to enter the apical foramen. They then divide into innumerable branches and form an extensive network of capillaries near the layer of the pear-shaped cells next the formed dentin. There are numerous veins also found, but these are somewhat larger than the arteries. Black tells us that the blood-vessels of the pulp are remarkable for the thinness of their walls, and that the smaller veins seem to be nothing more than endothelial cells which are placed edge on edge or margin on margin. The arteries have a circular and longitudinal layer of muscular fibres, but these are very thinly distributed.

There is always an effort on the part of the pulp to protect the dentin from destruction from whatever cause. A microscopic examination shows us how misleading it is to call this organ a nerve. Its matrix is a mass of connective tissue, in the substance of which we find nerve-fibres, medullated and non-medullated. These enter

the pulp through the apical foramen in bundles of various sizes. As they pass into the pulp they break into branches and form a rich network, a delicate plexus of fine nerve-filaments, next the outer pear-shaped cells. It is not certainly known how they communicate with the fibril. It has been suggested that the finer fibres may pass between the pear-shaped cells, winding themselves around the dentinal fibrils and thus pass into the dentinal canal. There is also a rich capillary network of blood-vessels near these pear-shaped cells in the newly-formed tooth, and when we inject these and examine them under the microscope there seems to be little room left for other tissues there. When the dentin is irritated by infection or its surface is uncovered by a break, there immediately follows a period of vital activity. If we examine sections of a tooth made when these changes are taking place we shall see that the formative cells in that portion of the pulp nearest the point of repair are filling up with glistening globular bodies, and the tissue about it is showing an increased vascularity, as though an active formative action were taking place, and in the canals opening towards the area of irritation, within the dentin matrix, we find minute glistening granules, which are being carried outward towards the point of lesion. These glistening particles have the appearance of being minute calcospherites. In studying this condition some years ago I satisfied myself that these appearances were the result of the vital action of the pulp in its efforts to repair the tissue, and that the minute glistening particles within the canals were in many ways similar to the minute globular bodies found in the tissues while the dentin matrix was developing. They are being forced into and through the canals of the matrix to the point of irritation, and I have seen long lines of them in the canals, nearly filling them up. In favorable cases the canals against the irritation do become filled, and a formative process goes on within the pulp-chamber until a calcified barrier is formed there, corresponding to the part disturbed or destroyed. When this change takes place the consolidated dentin in this area becomes slightly darker in color than normal tooth-structure, and might easily be mistaken for decay.

In carious pits and fissures of the bicuspid and molars the organisms of infection proceed inward through the dentinal canals towards the pulp. As it nears the pulp this protecting barrier is formed, and under normal conditions the infection is retarded, it

changes its course, and moves in the next weaker direction towards the approximal surface, usually without exposing the pulp—if taken in time. We also find the protecting consolidation in teeth that are worn down, usually in the mouths of old people, and when this change has taken place these teeth are not liable to decay again, except under very unfavorable circumstances. This protecting process forms that tissue known as the zone of resistance; the hyalin appearance of this zone tissue under the microscope is caused by the lime globules consolidating the canals that are in the substance of the zone. These changes are due in a large measure to normal conditions, as regards the vitality of the individual, but in cases where the constitutional conditions are below the normal, even where they seem favorable to decay, there is always an attempt made to retard the infection. Under certain conditions of environment and infection penetrating decay is so rapid that the vital action of the pulp is overwhelmed, and it becomes exposed and is in a pathologic condition even before the breaking away of the cavity walls.

The pulp is the central and largest source of vitality to the tooth, and it acts through its myriads of fibrils. Sometimes the ends of the fibrils are seen to be running slightly into the enamel substance. In the root portion they anastomose with the fibrils of the granular layer near the cement, and a communication is seen in many cases to be continued through the cementum by means of the lacunæ and their fibrils, and in a few cases I have traced them out to the pericementum. Pain of the dentin, following the touch of an instrument or from any irritation, is expressed through the agency of these fibrils, and we become conscious of the sensation through them. When irritation is caused by wear, erosion, or a break exposing the dentin, a section under the microscope will show that secondary dentin has been formed within the pulp-chamber, and this corresponds to the loss of substance of the dentin which has been affected. This secondary dentin is a tissue that has been called dentin of repair, and this is a manifestation of the vital action of the pulp. It is formed within the pulp-chamber, and is always an addition to the already-formed dentin. It forms against the portion of the pulp-cavity next to the fibrils which have been affected by the lesion. The enamel may wear or break indefinitely, and we shall find no compensation of any kind occurring until it reaches the surface of the dentin, whereon the vital power of the pulp is aroused and an

action of repair progresses in proportion to the extent of the injury. Some have thought these changes occur only in the teeth of old people, but such is not the case. They may occur at any age, and this process of repair has been found to have taken place in the tissues of a temporary tooth. These changes are all characteristic of the vital action of the pulp. The dentin is and was meant at all times to be a living tissue. As I have shown, it receives impressions of injuries and responds by processes of repair. Some of the ablest men in the profession have questioned the further value of the tooth-pulp after the full formation of the tooth has taken place. They look on it as simply a formative organ, and consider its mission closed with the formation of the tooth. It is therefore in their judgment quite as well to destroy it, take it out, and fill its chamber. The microscopic appearance of dentin after the pulp is removed shows that a large amount of dead organic tissue is left within the canals that cannot be taken out, and this dead tissue is a source of considerable danger to the health and vitality of the pericementum.

The subject of vitality, tissue repair, and compensation for injury on the part of the pulp should suggest a lesson for us all. The whole phenomenon of vital action shows that the pulp is, under proper conditions, always helpful in bringing about successful results if properly attended to. The restoration to a healthy condition of an irritated and troublesome pulp is among the highest acts of professional skill. It is unfortunate that so many pulps have to be destroyed. It is fortunate that so many teeth remain quiet and apparently healthy after pulp extirpation and treatment. With the death of the pulp we lose not only sensation in the dentin, but also all the changes which vitality gives to an organ, such as nutrition and recuperation. These can never by any possible means be revived. The main mass of the dentin of the tooth is dead. Myriads of lifeless fibrils are in its canals. It is true that the cementum, which was not formed from the pulp-tissue, does furnish a limited amount of vitality and nourishment to the root, which is covered by the pericementum; but the health of the pericementum is threatened by the dead tissue which is locked up in the canals within the dentin matrix. In vigorous health pulpless teeth have been successfully treated and remained serviceable for years. In cases of a lessened vitality we may expect more or less pericemental trouble, a darkening of the tooth, a recession of the gums, and an absorbing of the

alveolar processes. The tooth is beyond the influence of any systemic process, and there is no probability of a change for the better. Abscess and necrosis may supervene, and extraction is the last resort. I conclude by quoting an extract from a paper written in 1874 by Dr. J. E. Craven, who says— "Here is an organ formed of a delicate tissue, as is the eye, and because some agent of decay threatens its ivory walls, the ruthless hand of a blissful ignorance pours on its devoted head such destroying angels as carbolic acid, creosote, cobalt, and arsenious acid. Poor little pulp, you have been caught, and the destructive genius at the chair wills that you be deprived of your precious life. Why not lay aside those substances that blister and crisp the tissue until its life is enfeebled or lost, and instead resort to milder agents whose influence tends to cool the fevered part and allay the pain, reduce the inflammation, and use the food that nature herself would suggest to replace the covering the pulp has lost by decay?"

ANKYLOSIS OF THE JAWS.

BY G. LENOX CURTIS, M.D., NEW YORK. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, JUNE, 1904.

My present purpose in speaking is to report some causes of the varieties in permanent ankylosis and to show plans of treatment that I have found very successful. I do this in the hope that it will be of service to others. Preparatory to the permanent cases I will refer to cases of temporary ankylosis that I regard as unique and interesting. Temporary ankylosis, so commonly found, can be so speedily treated successfully that little new remains to be told. Nevertheless these cases sometimes cause much trouble to both patient and practitioner when they result in serious complications, which may occur if proper treatment is not given in the early stage. See Garretson, Marshall, and others for recognized methods.

The principal irritating causes of inflammation which lead to ankylosis of the jaws are exposed tooth-pulps, retarded, malposed, or impacted third molars, traumatism, cicatrix, tetanus, alveolar abscess, tonsillar, diphtheritic, and septic injections.

Permanent ankylosis is the result of osseous formations within the joint, causing partial or complete displacement or arrest of the synovial fluid, a condition, however, that may not occur for months

or years of immobility. Fortunately this is rarely met with, except in cases of rheumatoid arthritis; because of the great activity of the lower jaw its joint is usually the last to become affected. Inflammatory conditions arising from any cause should be corrected as early as possible, in order to prevent cicatricial formations.

In one case of temporary ankylosis which had lasted for several days I found on examination that it seemed to be caused by an exposed pulp. This case was immediately relieved by extracting from the pulp a drop of blood and applying a dressing of camphophénique.

The cicatricial variety follows suppurations and surgical operations through the face, such as are resorted to for the removal of tumors and necrosis of the jaws. When this condition is found in childhood and continues for a considerable length of time it is generally followed by an arrest in the development of the face and jaws. In illustration of this are the photograph and casts of the face and teeth of a boy, aged sixteen, who when in his second year fell from a window, fracturing his femur and also the inferior maxilla at the neck of the left condyloid process. The jaw fracture was not noticed until six months later, when the jaw was found to be ankylosed. The surgeon concluded that the trouble was due to muscular injury at the time of the fall. Thinking that in time the muscles would recover of themselves, he advised no treatment. Three years later another surgeon found the fractured jaw, but did not suggest any plan of relief. Later indefinite different attempts were made to force the jaws apart, but were unsuccessful. On examination I found the ankylosis and the shortening of the jaws were due to the overlapping of the bones, which had become firmly fixed. The median line of the chin was considerably to the left. Several of the deciduous teeth which should have been cast off were present, and the mouth was in a generally disordered condition. I removed these teeth, reduced the inflammatory condition of the gums, and advised an operation for adjusting the ends of the fractured bones. I was told that several surgeons were consulted by the father, who was told that they would discourage surgical interference, consequently the boy was allowed to grow up in this unfortunate condition. My belief at that time was that the bones could be separated by means of a saw or bur, and readjusted, and the ends of the fracture freshened and held in position until union

of the bones was complete. He is now twenty-eight years of age.

Another case of ankylosis, the cause of which is of more than usual interest, is that of a young woman who for several years had been treated for repeated granular growths in the sockets from which lower left molars had been extracted. On examination it was found that all of the jaw, including the ramus back of the first bicuspid, was necrosed. To my amazement I found the third molar was malposed and lying at the neck of the condyloid process directly below the condyle. The treatment consisted of opening the periosteum sufficiently to permit the removal of the tooth and the necrosed bone, and treating the wound until bone was reproduced. The periosteum was retained as an interosseous splint until sufficient new bone had formed to hold the jaw in position. By this plan there was no shortening of the jaw and no deformity of the face. It is obvious that this operation was done within the mouth. I was unable to ascertain whether ankylosis on this side of the jaw was complete or of the temporary variety. By the use of the screw-jacks a complete and permanent use of the jaw was reestablished.

I saw in consultation another case of permanent ankylosis, resulting from a surgical operation made through the face for the removal of necrosed bone in the lower jaw, that resulted from an abscess on a molar. The cicatrix was several inches in length and about an inch in width. The patient told me he had been under treatment in a hospital for more than a year, much of which time his face was bandaged. I advised resecting of the scars, skin induction, and forcible separation of the jaw by means of screw-jacks.

I am now pleased to be able to bring before you a patient who, at the age of fourteen, was brought to me in June, 1893. At the age of six years the patient had diphtheria, with extensive ulcers in the throat, the soreness from which continued for a considerable time after the disease had subsided. During this period pain was caused in opening the mouth, when the child was permitted to take liquid food between the teeth. This method of taking nourishment became a habit. Four years later, owing to toothache, she was taken to a dentist, who, finding her jaws were ankylosed, referred her to a surgeon for treatment. Various methods, including the use of the "Grady screw," to pry and keep the jaws apart, were resorted to with slight results. Precaution was not taken, however, to protect the teeth from fracture, and some

were broken and abscessed, gingivitis also resulting. Efforts to correct the ankylosed condition were finally abandoned, and the jaws closed and became rigid. At the time the effort was made to force the teeth apart the patient was encouraged to crowd solid food between the upper and lower teeth and crush it with the tongue against the roof of the mouth. This she was finally able to do with considerable success, but in doing this she had forced the lower teeth back and the upper teeth forward, causing some deformity. Examination showed the patient to be anemic but otherwise in a fairly good state of health.

By forcing a wedge between the teeth I was able to secure one-eighth of an inch space on the left side. The reason for this was that on the left side there was only cicatricial ankylosis, while on the right side it was osseous. The condition of the mouth was deplorable. General gingivitis prevailed, several of the permanent teeth were loose, others were abscessed, and many of the deciduous teeth were present, thus retarding the full eruption of the permanent teeth. The crown of the upper right central was lost. By treatment much of the inflammatory condition of the gums was reduced, but not until the jaws were so far separated that the abscessed and the deciduous teeth could be extracted. My first thought was to devise and construct a mechanism that could force the jaws apart by causing an even pressure on the teeth. I had a depressor made of steel spring, which I was able to crowd between the jaws while the wedges were in position and while the patient was under profound anesthesia. While the head was firmly held by an assistant I was able to put sufficient force to the depressor to gain one-eighth of an inch space. With this space I was able to insert a flexible double screw-jack that I also devised for this purpose. The surface of the hand-depressor and the blades of the screw-jack were serrated, the object of which was to lessen the danger of slipping. If it is necessary to further reduce this danger, soft vulcanite rubber or gutta-percha may be placed on the masticating surface of one or more of the molar teeth on either side of the mouth. The blades of the jack were made of thin spring steel. The object of this was not only to cause even bearing on the teeth, but to prevent undue pressure on the teeth and luxation of the jaws. The screws were purposely made long, so that the patient might tighten or loosen the jack at will. By this simple mechanism

the patient was enabled to adjust it and make as slight or as much pressure as could be easily tolerated. This patient was able to wear the jack much of the time both day and night. When three-eighths of an inch space had been secured soft wax was flowed over the blades of the screw-jack and it was again put in position. By this means I was able to secure an impression of the antagonizing ends of the teeth, by which casts were made and splints of vulcanite were constructed, the approximating surfaces of which were made flat, so that when in place there was an equal bearing at all points. These splints enabled me to put greater pressure on the screw-jacks and eliminated as well all danger of fracturing the teeth. As the jaws opened better-fitting splints were applied. Chloroform was administered every few weeks, and all possible pressure was made to force the jaws apart. Almost from the beginning of the treatment there was an inflammation established in the right joint. While at times this operation was attended by considerable discomfort to the patient, which prolonged the work, it had much to do with the final success, because absorption of the osseous deposit within the joint was established, and by this constant agitation it continued until a fair action in the joint was established.

One of the things which retarded our efforts was the degenerated temporal and masseter muscles, their condition being due to the years of disuse. These muscles required redevelopment from that condition found in a child of six years to that of a girl of sixteen. Until this was accomplished there was but moderate benefit derived from opening and closing the mouth. In order to develop the strength of the muscles of the face, as well as to elongate them, I devised a set of springs which were securely fastened in grooves cut in the approximating surfaces of the splints on either side of the mouth. At the forward end of the grooves there was an opening made through the splint of sufficient size to accommodate the studs, which were one-sixteenth of an inch in thickness and one-eighth of an inch in length. The principal object of these studs was to prevent the springs from slipping out of place, and to doubly secure them they were also wired to the lower splint. These springs were very stiff, and only with great effort by the patient could be compressed. In order to get the splints into the mouth with the springs in position, they were applied while bound tightly together, and when in position these ligatures were cut. At the end of one

year's treatment the patient had about one-half the normal opening of the jaw, and for the next year the work of continuing the treatment was intrusted to her, because through personal illness I was absent from practice. On my return I was pleased to find that substantial progress had been made, the space gained was maintained, and the muscles had materially improved. I took up the work again along the same lines and continued until almost the normal opening of the jaws had been secured, with, however, but little lateral motion, the adhesions which held the left side of the jaw readily giving way to the continued pressure of the jack. In the course of a year the patient's health demanded exclusive attention, and because of tuberculosis further maxillary irritation was at this time discontinued. Within the past six years, however, the patient has seldom found it necessary to make use of the springs, her health also has gradually improved, and while not robust she is in fairly good condition.

DISCUSSION.—*Dr. G. V. I. Brown, Milwaukee:* I think Dr. Curtis is in danger of being misunderstood, since he evidently describes conditions of true and false ankylosis. He speaks of permanent and temporary ankylosis, and gives as etiologic factors malimposed third molars, pulpitis, and conditions of that character. What Dr. Curtis really means is not ankylosis, but trismus. I think we ought to draw a very distinctive line between a muscular contraction of a temporary nature, as described, due to more or less direct irritation of the nerve-trunks, and a condition caused by inflammatory processes or degenerative conditions of the temporo-maxillary articulation. So far as operative measures are concerned nothing can be said but the highest praise. These cases are extremely troublesome, and Dr. Curtis's results are a warrant that the proper methods were employed.

SUBMAXILLARY CELLULITIS.

BY A. P. CONDON, M.D., D.D.S., OMAHA. READ BEFORE THE NEBRASKA
STATE DENTAL SOCIETY, MAY, 1904.

The subject of the paper that I wish to present is one upon which very little has been written; some text-books only briefly describe this form of inflammation, while others do not mention it at all. Submaxillary cellulitis, generally known as Ludwig's angina, is an

acute phlegmonous inflammation occurring in the loose connective tissue of the submaxillary region, between the lower jaw and the hyoid bone. It differs in no way in its pathology from the other forms of cellulitis, such as that observed in the pelvis, in carbuncle, etc. It may be caused by the different forms of pus microorganisms, but it is the streptococcus or the bacillus of malignant edema which is the usual cause, the latter producing the most malignant form.

The method of invasion of the tissues is usually through an infection atrium, but to state, as some authorities do, that it never occurs otherwise, seems to me irrational. There is no reason why a hematogenous infection can not arise here, just as it occurs in other parts of the body, such as in osteomyelitis, the tubercular infections of bones and joints, and the idiopathic inflammations of the serous surfaces.

The disease may be secondary to injuries, operations, or infections in the mouth or pharynx, or may follow inflammations of some of the cervical glands. It has also been known to develop after fracture of the larynx and hyoid bone. The infection may extend from the ear along the digastric muscle to the submaxillary region. As a rule, however, it occurs through the mouth by way of the duct of the submaxillary gland or a carious tooth. The inflammatory process is beneath the deep cervical fascia, which prevents the involvement of the more superficial structures, and favors the extension of the inflammation to the glottis, which sometimes results in a fatal edema glottitis. If this occurs a tracheotomy must be done to save the patient. The numerous veins and lymphatics in this region become the seat of inflammation, and infective thrombi may be formed in the veins, which being carried into the general circulation produce septicemia and pyemia. The infection may be so intense, especially if caused by the bacillus of malignant edema, as to produce gangrene of the tissues, and a rapidly fatal toxemia may follow. Submaxillary cellulitis occurs more often in debilitated individuals, during the convalescence from the infectious diseases and following operations which necessitate prolonged rest in bed.

The symptoms of a beginning of Ludwig's angina are frequently obscure. Owing to its depth from the surface, its separation from the skin and subcutaneous tissue by the deep cervical fascia, redness, heat and swelling may not be very evident. At a more advanced

stage of the inflammation the swelling increases and the skin becomes tense and brawny from the inflammatory edema and it can not be moved over the parts beneath. The tongue is pushed up and there is difficulty in speaking and swallowing. The constitutional symptoms are always very marked. The attack is usually ushered in with a chill, the temperature ranges from 103 to 105 degrees, there is vomiting, diarrhea, and sometimes delirium, or a typhoid state may supervene. In fact, all the symptoms of a violent septic condition are present.

The diagnosis of a submaxillary cellulitis is usually not difficult. This condition is not likely to be mistaken for a carbuncle, since a carbuncle comes on insidiously, is more localized, and we have the subcutaneous tissues and skin especially affected, while in the cellulitis the deeper structures are involved and there is no evidence of the necrosed areas in the skin, which is a diagnostic point in carbuncle. The simple abscesses occurring in this region would hardly be confounded with Ludwig's angina, as their onset is slow and there are not the marked general disturbances.

We treat a case of Ludwig's angina just as we do a phlegmonous inflammation in any other part of the body. If the case is seen early and there are no marked general symptoms, keep the patient quiet, apply ice freely to the inflamed part, and give opium internally to relieve pain. If, however, the local and general symptoms do not abate, but progressively increase, the part must be incised and drained, whether pus has formed or not. We do not wait for the formation of pus in pelvic cellulitis, acute osteomyelitis, or carbuncle, but when the symptoms point to a progressive septic condition, incise thoroughly and thus relieve the tension, drain the septic focus and prevent the absorption of the bacteria and their toxins. It is a well established fact that the absorption of pus or inflammatory exudate is increased by pressure. When the tension is removed absorption to a great extent subsides. Examples of this we observe every day after the draining of an acute septic focus in any part of the body, when the constitutional symptoms are seen to disappear.

In the most violent cases of septic infection we do not have the formation of pus, but in these cases the incision and drainage of the septic focus are indicated just as much and probably more so, than if we had suppuration. To the maxim "*ubi pus ibi evacuatio*"

another as important may be added, namely, when there is an infected focus, the absorption from which produces grave general symptoms, that focus should be incised and drained if accessible, irrespective of the formation of pus.

To drain a case of submaxillary cellulitis an incision should be made in the median line extending from the chin to the hyoid bone or transversely across the submental space. The incision should be made deeply in the inflamed area, and if there is necrosis the tissue should be curetted, irrigated, and a moist antiseptic dressing of bichlorid of mercury, 1 to 3,000, or carbolic acid, 1 to 200, applied.

The general infection or intoxication must be combated and the patient's strength sustained. Alcohol, quinin and normal salt solution given per rectum are probably the best line of treatment. Digitalis and strychnin may be used as a heart stimulant. As a large number of these cases are caused by the streptococcus, the anti-streptococcic serum should be used where the general symptoms are severe.

Within the past few months I have seen three cases of Ludwig's angina, two of them being in consultation with dentists, and I am glad to say they had made the correct diagnosis.

INLAY ANCHORAGE SYSTEM FOR PARTIAL PLATES AND BRIDGES.

BY F. E. ROACH, D. D. S., CHICAGO.

There are many ways of restoring lost teeth, the one most commonly employed in the restoration of partial dentures being the stationary bridge, constructed in various ways and in most cases with a view to obtaining what is termed the self-cleansing space. On the other hand, there are operators who employ stationary saddle-bridges, claiming for them better sanitation than the so-called self-cleansing bridge affords. It seems unnecessary to enter into an argument as to the merits or demerits of the stationary saddle, and I believe you will agree with me that the self-cleaning is more often a self-soiling space, and that it is practically impossible to mechanically or otherwise cleanse these inaccessible surfaces on bridges that are cemented to place in the mouth.

Deficient restoration and the too frequent destruction of good teeth to serve as abutments are worthy of our serious consideration.

The desirability of normal restoration for comfort and esthetic reasons is at once apparent. In our endeavor to gratify the demands of our patients in some cases or to supply an unquestioned need in others, and too often for pecuniary reasons, we are led to a very questionable destruction of sound teeth to serve as abutments for bridges.

Granting that the stationary bridge has some advantages, and that it has a place among the many methods of supplying the lost dental organs, I am nevertheless strongly in favor of the removable bridge in the great majority of cases, provided adequate means of anchorage is afforded. The problem of anchorage of partial den-

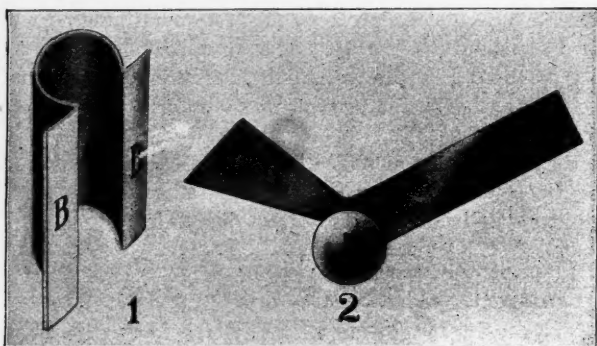
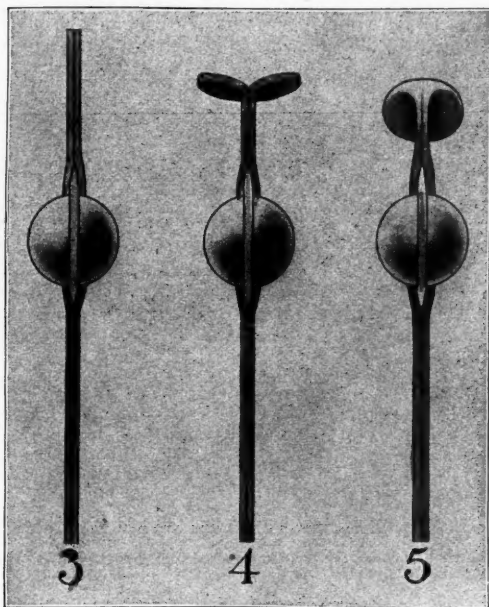


Fig. 1 is the tube or female part. Fig. 2 is the male part. D is upper stem intended to close end of tube, overcome lateral movement, and prevent lifting at heel. E is split ball and C is stem for attachment to the denture.

tures, whether plates or bridges, has engaged the attention of the profession continuously and has resulted in many forms of good, bad and indifferent attachments to the natural teeth. The gold clasp in its numerous forms has no doubt served this purpose in a greater number of cases than any other method, and, while filling the requirements admirably in some cases, and without injury to the anchor tooth, it is my belief that this form of attachment has been the cause of premature loss of many sound teeth, and at the same time a constant source of annoyance to the patient. The ordinary clasp, as adjusted by the average operator, is a failure. Instead of an aid it is more often a hindrance, for instead of holding the denture in position it more frequently holds it out of place.

The demand for a better means of anchorage has led to numerous systems of attachment for bridges and partial plates, some of which are worthy of our attention as being in some respects decided improvements over the stationary work. However, nearly all have features which cause them to fall short of the requirements that make for ideal and satisfactory results. While slightly different in form they are in principle the same, and what may be said of one



Figs. 3, 4 and 5 are end views of the male part. Fig. 4 shows plates of upper stem bent over, and Fig. 5 shows the stem soldered and finished.

will apply in a general way to the others. The attachments consist of male and female parts, one of which is to be secured to the tooth and the other to the denture, thereby affording a telescope bearing of the parts, the friction produced by the spring in the male part preventing dislodgment during mastication.

The most pronounced objections to this system are the exactness required in construction, the leverage on anchor tooth, and the fact that the male or spring part of attachment is placed in the mouth instead of on the denture. With the most painstaking care

warpage or some unknown cause will often change the position of the parts, which means trouble when we come to the final adjustment in the mouth. The unyielding rigidity of the attachment renders its use impracticable in cases having anchorage at but one end. The strain exerted upon the anchor tooth from the force applied to the attached teeth is enormous, sufficient usually to loosen and very materially weaken and interfere with its usefulness. As evidence of the strain in such cases, the attachments are often broken or torn bodily from the crowns to which they are soldered. The last objection—that of tightening the attachment—is not a serious

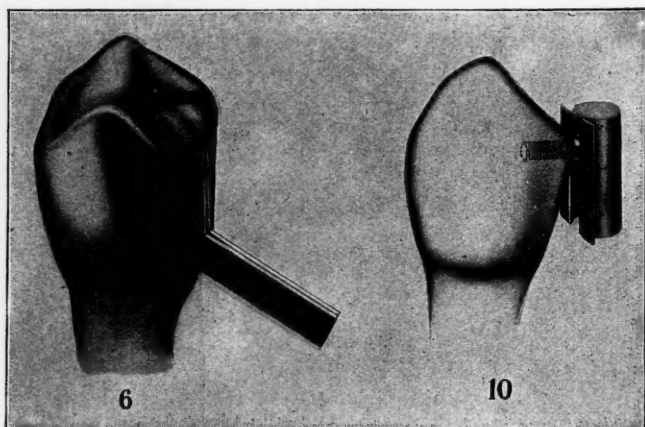


Fig. 6 shows attachments in place on a gold crown. Fig. 10 shows how attachment is made to a sound tooth.

one, but is of considerable importance to the patient, inasmuch as it requires a visit to the dentist when loosening, occasioned by wear, has occurred.

In spite of any objectionable features possessed by the removable denture, it is preferable for sanitary reasons if for no other, but in addition to the ideal, from a hygienic standpoint, may be mentioned greater possibilities of restoration of lost tissues, more artistic effects, facility with which repair can be made in case of breakage, and simplifying any subsequent work that may become necessary upon the adjoining teeth. These advantages apply to all removable dentures, and if in addition to these we can add others, and at the same time eliminate some of the most serious objections

to the other forms of attachment, we have made an advance in the right direction.

This I believe I have accomplished in the following system, and although its practical application is limited to a short time, the principles it embodies are correct, and it is to these that I wish to call attention. As indicated in the title of this paper, this system of anchorage may be properly called an inlay anchor. While not limited by any means to the inlay in the strict sense of the word, its use will occur in the majority of cases in the form of an inlay, as

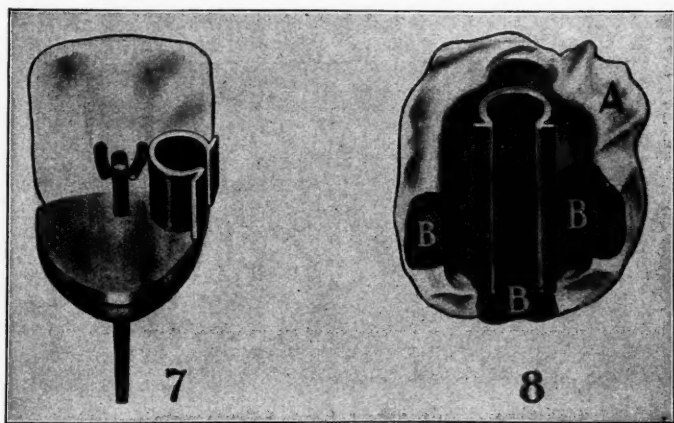


Fig. 7 shows position of tube in porcelain or Richmond crown. Fig. 8 shows position of tube in matrix for gold inlay—A is matrix, B is piece of thin, pure gold plate soldered to end of tube and burnished into contact with matrix as an aid in securing correct position of tube.

the female part of the appliance may be inlaid into an inlay, a crown, an amalgam or gold filling, or directly into the tooth.

Briefly, the parts of the attachments may be described as follows: The female part comprises a round tube, No. 1, having an open side which extends throughout its length, and is made preferably of 22-k. gold or iridio-platinum. The male part, No. 2, comprises a split ball with a projecting stem for attachment to the denture, and another stem projecting at right-angles which serves the purpose of closing the end of tube, and as a stop preventing lateral movement in bridges and lifting at the heel of partial plates. This part of the appliance is made of clasp metal only. Those intended for use in rubber work have grooved stems and those for

porcelain are threaded to fit a threaded tube, into which they are to be cemented after completion of the work. The neck of stem is reduced just at the juncture and including a portion of the ball, thus preventing lateral impingement of edge of tube. The ball is made slightly larger than tube, so that when forced to place the two halves of the ball are pressed together and the tension is maintained by the spring of the metal.

The principal features noted in connection with this system may be summed up as follows: No jig is required to parallel the parts. The split ball will slide readily to place though the tubes be set at varying angles. This feature simplifies construction very materially



Fig. 9 shows tube with spur soldered to and extending into step of cavity, and matrix adjusted for holding securely until filling is inserted.

and overcomes one of the most objectionable features found in other attachments. By reason of the breakjoint, leverage on the anchor tooth is eliminated. This very desirable point does not obtain in any other form of attachment. This feature alone is very valuable when any number of teeth are to be swung back of the anchor tooth. A typical case of this class is one requiring all the teeth back of the cuspids. These cases are exceedingly difficult in lower dentures. In the upper we may obtain reasonably good results with the so-called suction plate, but in the lower there is little adhesion, and the conical shape of the cuspids makes successful clasping in most cases almost if not wholly impossible. In such cases if decay has attacked the cuspids on the distal surface the tube is made a part of the filling, thus serving the double purpose of filling and anchor

for plate. Should the teeth be free from decay it is my practice to drill a small hole at right angles with the long axis of tooth at about the contact point and anchor one of the split balls for attachment, the tube being attached to the denture.

The appliance, No. 7, is but little in the way of adjustment of adjacent teeth in the denture, when the tube is placed outside of tooth or crown, but when inlaid it is absolutely out of the way, even though inserted directly in line with contact point.

Leverage is removed, many ways of securing the attachments to the teeth are made possible, and the probability of breakage of parts is reduced to a minimum. Another advantage is the ease with which the attachment may be tightened, as with the blade of a pen-

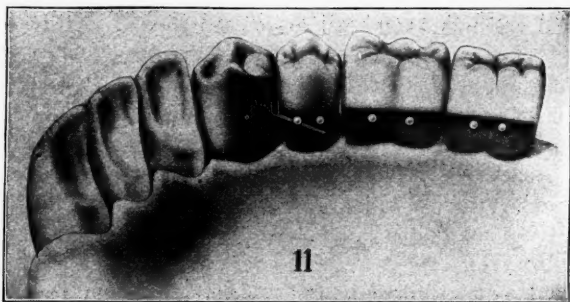


Fig. 11 shows relative position of attachment and supplied teeth. It also shows that the attachment is not in the way of adjacent teeth.

knife the wearer can easily adjust the spring. The avoidance of plates, in many cases extended from one side of the mouth to the other, is of especial value in partial cases where the posterior teeth are to be supplied. A gold clasp metal wire, about 15 gauge, fitted accurately, is much less in the way, is stronger than most plates, and is free from irritation to gums and does not injure the teeth. While the wire may be used in connection with some other methods, it has proven more satisfactory to me when used in connection with this system.

The attachment is well adapted to porcelain construction. In making a porcelain crown with the tube inlaid the procedure is as usual except that tube is adapted and waxed to place with the facing and invested so that they may be soldered at the same time. Body is packed around tube, baked and finished in the usual manner. A

heavy iridio-platinum tube is best for this purpose, and when reinforced with platinum solder is sufficiently rigid to overcome any tendency to cleavage of porcelain around tube. Fig. 8 shows relative position of cope, facing and tube.

Many cases will present in which this attachment can be used with eminent satisfaction and at a great saving of tooth structure in gold inlays. This means of anchoring the tube may seem hazardous, but a careful study of the comparative strain exerted upon the anchor with this and other attachments will show a great difference in favor of this method and a justification of its employment in many instances with the gold inlay in preference to the gold crown. Here the natural tooth crown may be used. Many methods of securing the proper position of the tube in the inlay have been tried and the following is suggested for simplicity and accuracy. After the matrix is fitted to the cavity the tube, with a piece of about 40-g. pure gold plate soldered to the bottom, is positioned in the matrix while in the cavity and the surplus ends of gold plate are burnished into contact with the matrix in two or more places. The tube and matrix are now removed separately, readjusted to their relative position and soldered.

The tubes may often be securely anchored in gold or amalgam fillings where care is exercised in selecting the cases and making the fillings. The procedure is practically the same for each. A spur of wire should be soldered to back of tube so that it will be well down into cavity and rest against side opposite tube when it is in line with contour to be restored. The matrix is now adjusted and tightened until tube is held securely in desired position. The material may now be packed around tube and finished in the usual way.

CARE IN APPLYING THE RUBBER DAM.—I think the average dentist should have the dam applied to his own teeth by some careless man at least once a week. He would then use care in applying it for others. Ordinarily there should be no pain and very little discomfort through its application. In the cold weather, if you will place the clamp in the forceps, and then hold the clamp over your Bunsen burner just long enough to warm it, your patient will bless you. If in carrying your ligature between the teeth you are careful not to let it strike the gum suddenly your patient will appreciate it. If you are about to fill an ordinary cavity it is absolutely cruel to ligate several teeth, carrying the ligature above the natural gum line.—F. MILTON SMITH, *International*.

Digests.

ATROPHIED TEETH. By G. V. Black, D. D. S., Chicago. The term atrophy seems to include two distinct ideas—the one a wasting of a part because of a local failure in the nutritive processes, the other a failure of the development of a local part because of a failure of nutrition. Atrophied teeth belong to the second class; they have never been fully formed. They come through the gums in the condition of deformity in which they are afterward seen and do not, as some seem to suppose, waste away after having taken their places in the arch. The deformity is a result of incomplete formation.

In the human teeth there is no process of repair and the deformity is permanent. Similar phenomena occur in the finger nails and the hair. During an illness that interferes seriously with nutrition

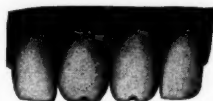


Fig. 1.

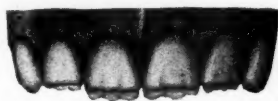


Fig. 2.

the portion of the finger nail then forming will be dwarfed, which will appear later as a groove across the nail. This, like the marking of the teeth, is not remedied by any reparative process, but the nail is continuously growing and the groove moves on over the length of the nail and disappears. During a severe illness a section of hair is imperfectly formed, and when in the process of growth this section arrives at the surface of the skin and is subjected to bending it breaks and the hair suddenly falls away. This is a common phenomenon following severe cases of typhoid fever. The hair follicles are not injured and the hair is replaced by the regular process of growth. In the continuous-growing teeth of the rodents such an injury would be finally removed and remedied in the same way as the grooving seen upon the finger nails, but this can not occur in the human teeth.

The deformity, though much varied in different cases, is when closely analyzed always similar in character. It always consists in the failure of the formation of some specific portion of the tooth and

of several teeth together. The portions of the several teeth affected are always that portion of each which was in process of formation or growth at the same period in the person's existence. To understand this well one should study closely the calcification of the crowns of the teeth and the contemporaneous lines of calcification of the different teeth. In the incisors it is oftenest seen in the form of a groove, or a pitted groove, running across the labial surface from mesial to distal, and close inspection will generally show that it encircles the tooth completely, though it is most prominent upon the labial surfaces where the enamel is thickest. It is seen more often on the incisal half of the length of the crown. It may be near the cutting edge of the tooth or anywhere from that point toward the gingival line. There may be a single groove or pitted line, or there may be two or even three of these. The teeth affected are the incisors, cuspids and first molars of the permanent set, and very rarely the first bicuspid. If it is very close to the cutting edge on the central incisors it may not appear on the laterals, but the occlusal surfaces of the first molars will be atrophied. This is because these parts of these teeth are in process of formation at the same time. If the groove is a little further removed from the incisal edge of the centrals the lateral incisors will also be similarly affected. If it is a little higher still the four incisors, upper and lower, the cuspids and the first molars will be affected, but the bicuspid will be free from injury. It is exceedingly rare that the bicuspid or the second or third molars are affected by atrophy, for the reason that the enamel and dentin of these teeth generally have not begun to form until after the age at which these effects are liable to occur. In all my observations I have seen but four or five cases in which the first bicuspid was marked. The time of the occurrence of these injuries seems to be confined rather strictly to the first five years of a child's life.

In the engravings which accompany this article I have endeavored to illustrate some of the more severe types of these deformities. Fig. 1 represents what is known as the typical Hutchinson tooth, from the claims of Mr. Hutchinson, a specialist in venereal diseases in London, who insisted that this deformity was the result of inherited syphilis. In this case the middle lobe of the central incisors has failed of formation, and generally an ugly deformity of the occlusal surfaces of the first molars accompanies this type. In the

molars there are likely to be little spiculæ of cusps sticking up much too close together, while the rest of the occlusal surfaces is much too small, crumpled together and sunken into the crown, which, other than this, will be of full size and form. These teeth decay quickly in case there is a tendency to caries in the individual.

In the incisors only the centrals are affected and the middle lobe only. This seems to have failed entirely and a deep, dark-colored pit remains in its position. The mesial and distal lobes are formed of normal tissue, but they are drawn together in such a way as to give the incisal portion a rounded appearance, instead of the usual horizontal cutting edge. This seems to occur from the fact that the middle lobes of the centrals are the first to begin their calcification, which I have occasionally found just begun at birth, and if not begun then is usually begun within one year. The injury therefore occurs soon after the birth of the child from some cause which inter-



Fig. 3.

feres with nutrition. In the incisors this form of atrophy is apt to be attacked by decay in this incisal pit very soon after the teeth have taken their places in the arch. They should be filled at once if decay is discovered. This particular form of atrophy is seen less frequently than others.

The occlusal surfaces of the first molars are occasionally seen badly atrophied when the incisors have escaped. Usually these have just begun their calcification at birth, and occasionally the calcification of the central incisors does not begin for one year after birth. In this case a severe illness may injure the molars and not injure the incisors.

Much the more common forms are those illustrated in Figs. 2 and 3, the illustrations showing rather bad cases. In Fig. 2 the deformity is confined apparently to the cutting edges of the central and lateral incisors above and below, and the four first molars. In the case here illustrated the whole of the incisal edge of the incisors is dwarfed and shortened. This dwarfed portion ends abruptly

toward the gingival, which is common in these cases. In many there is more or less rounding-down of the well-formed part of the crown to the deformed part, but often it is so abrupt as to form a square shoulder along which there is apt to be a series of sharp, deep pits. In the case from which this illustration is taken there are no pits whatever, and the deformity consists purely in the dwarfing of the incisal edges, but the whole of the occlusal surfaces of the molars was in very bad condition because of dwarfing that presented many abrupt fissures in which decay began almost immediately after they had come through the gums. In such cases as this the appearance of the teeth may be much improved by grinding away the dwarfed portion and shortening the cuspids a little to correspond with them. The teeth may appear a little short, but that is sometimes much less noticeable than the blemish.

In other cases occurring in the same locality and affecting the same teeth there may be but little dwarfing of the incisal edges of the incisors. The effect may be but a slight groove that may be smooth or more or less pitted, or in cases of a still milder type the distinct groove may be lacking and a row of fine pits in the enamel will be the only deformity. Generally the effect is more marked in the occlusal surfaces of the first molars than in the incisors.

In the case illustrated in Fig. 3 the injury has occurred later, beginning when the child was between three and four years old. The incisal portion of the incisors has already been formed, and there is therefore no dwarfing of this portion of the tooth, but there is a very marked groove encircling the crowns of the incisors and cuspids, marked with pits with smoothly-rounded bottoms. Both the groove and the pits in the groove are abrupt toward the gingival and thin away toward the incisal. This is a constant characteristic of these deformities, which will be readily understood by a study of the calcification lines of Retzeus. The circular form of this deformity, as it passes from tooth to tooth across the front of the mouth, is well marked; indeed, it presents rather more of the circular form than usual, indicating especially that the cuspids were a little later than usual in their calcification, and for that reason the mark is nearer the incisal edge in proportion to the position on the incisors than it would otherwise have been.

It is not frequent that we see so severe a mark as here shown so high upon the labial surfaces of the incisors. It seems to be a

general rule that the higher upon the teeth the less marked is the deformity. Generally in this position on the centrals the mark is a shallow groove, more or less pitted, or a row of pits without a distinct groove.

In Fig. 4 I have illustrated a case that is somewhat out of the usual form in several particulars. When the impression for the cast from which the illustration was made was taken the cuspids had not come through the gums, but one of the first bicuspid had erupted, and to my surprise showed a deep mark encircling the point of the buccal cusp. Also the history of the case shows that the lateral incisors did not erupt for nearly two years after the centrals had taken their places. In the centrals the incisal edges are fully formed, but there is a deep groove with rounded pits encircling the crowns at nearly mid-length, while nearly the whole incisal half of the laterals is badly deformed. This indicates that the beginning of



Fig. 4.

the calcification of these teeth was late, as compared with that of the centrals. This particular form of deformity of the lateral incisors is not very frequent, but a considerable number have been seen, quite enough to indicate a tendency to this particular deformity. In the common vernacular this has been called the *inverted finger nail deformity*. If we imagine the finger nail taken up and turned with the convex side down and set back in the end of the finger, we would have something very like this deformity. The whole appearance of this case at the time of my observation of it indicated unusual irregularity of the time of calcification and eruption of the different teeth. The first molars, both above and below, had already been destroyed by decay, beginning in the deformity of the occlusal surfaces.

Figs. 5 and 6 show a lower incisor with a double deformity. Fig. 5 is a view of the labial surface, and Fig. 6 of the mesial surface. The dotted lines show the normal tooth form. The two taken

together show the extent of the dwarfing of the crown of the tooth.

Fig. 7 shows an upper central very badly deformed. This is also a double deformity and was further injured by decay starting in pits in the abrupt portion of the groove nearest the incisal. The sharp, deep pits shown along the line of the second groove have not been caused by decay, but were there when the tooth came through the gums. These teeth are from different persons, and in both cases were extracted in order to remedy the defect with artificial teeth. This seems to have been done under the mistaken notion that the roots of the teeth would not be good for artificial crowns, which was wrong. Extended observation shows that the roots of such teeth are as apt to be well developed and good for crowning purposes as those of any other teeth, and when the crowns are so badly deformed as to render such proceedings necessary artificial crowns should be resorted to rather than the removal of the teeth. There is a hope that in the future such teeth may be restored to a comely appearance by means of porcelain. In case the crowning involves the removal of the pulp this should be delayed as long as possible in order that the roots may be fully formed and the apical foramen reduced to a small size. One should wait until the patient is sixteen to eighteen years old, and twenty would be still better.

Etiology.—Atrophy of the teeth is always caused by some illness that has interfered with nutrition at the same time the particular parts of the teeth affected were in process of calcification. My attention was strongly called to this through a controversy between Hutchinson of London and Magitot of Paris, who took opposite views some thirty or forty years ago. From Hutchinson's observations he was led to believe at first that all of these cases of atrophy were caused by inherited syphilis, while Magitot had come to the conclusion that they were due to eclampsia. This controversy led to a closer study of this whole subject, and finally Hutchinson yielded the point so far as to say that inherited syphilis was a frequent cause, and for many years held that the type which I have shown in Fig. 1 was always caused by inherited syphilis. That form has therefore been called the Hutchinson tooth.

I have followed this subject pretty carefully ever since, adding observation after observation until I have arrived at the conclusion that there is no special form of disease that is especially blamable for this affliction, but that any form of disease which seriously inter-

feres with nutrition is liable to bring about this result, i. e., that it is not the particular form of disease, *but that it is the condition of malnutrition that is the cause*, no matter what the disease which has induced that condition. I have seen several cases of typical Hutchinson teeth that were certainly in no way connected with a syphilitic taint of any kind.

Some of these observations may be of interest. Mr. and Mrs. B., whom I had known intimately from childhood, had a child which seemed healthy at birth, but soon afterward became anemic and did very badly for two years. Growth was a failure during that time, and it was with great difficulty that the child was kept alive. In its third year, however, it recovered and became strong and healthy



Fig. 5.



Fig. 6.



Fig. 7.

and developed well. When the permanent teeth came through the gums nearly the incisal third of the centrals and laterals was badly dwarfed, the points of the cuspids had failed, and the occlusal surfaces of all the first molars were badly atrophied.

In another case a kinswoman was visiting at my house with a little girl two and a half years old. The child had not seemed very well of late, though she showed no particular form of illness. She would play much of the time, but seemed to get very tired. One day I was suddenly called and found her apparently dead, a condition that had been preceded by a violent clonic spasm. I instituted artificial respiration at once, and after a few moments there was a sigh and directly another, and within a few minutes the respiration and circulation were reestablished. The child dropped to sleep almost

immediately, while yet in my arms, and seeing that the breathing was sufficiently full and regular I laid her on a couch, left her mother to watch her, and went back to my business. She slept three hours, and when she awoke was ready to play again. She remained rather dull for another month, when the condition seemed to pass away. There was but the one spasm, but when the permanent teeth came through they were deeply marked, corresponding with the time of this occurrence.

I attended a child two and a half years old through a severe case of typhoid fever. When the permanent teeth came through they were marked with a deep groove, irregularly pitted, similar to Fig. 3, but not so high up on the crowns.

An English woman brought her child to me on account of a very ugly marking of the incisors that had just come through the gums. In reply to my inquiries she could not remember that the child had had an illness of any kind. The boy had always been healthy and had escaped all of the infantile diseases. Being convinced that something had occurred that would have been noted, I asked her if the child had had any kind of an injury. This quickly brought out the statement that the child had had a severe burn, a scald, on the side and back, that had healed slowly after much suppuration. Indeed, the child had been very ill for a month or six weeks. The time corresponded with the marks upon the teeth.

Cases like these, but different in detail, could be multiplied almost indefinitely. Scarlet fever, measles and whooping-cough come in for a large share in producing these marks. My observations for some time led me to believe that scarlet fever and measles are more often to blame for the rows of fine pits, but of late I have found so many of these following other forms of disease that I am led to doubt the distinguishing features of these marks. Certainly hereditary syphilis comes in for its full share of these cases. On the other hand, we can not say, at least I can not, that marked teeth will result from this or that illness. If the hair falls out or the finger nails show a groove after an illness we are apt to find the teeth marked also. Many of the cases that I have noted and watched for the coming of the permanent teeth have presented teeth without a blemish. Indeed, among all of the cases that I have noted and watched the marked teeth have been the exception rather than the rule. Still, it remains true that when I have been able to obtain

a satisfactory history the marked teeth have coincided in time with some form of disease that might well have interfered seriously with the nutritive processes. This history is not always easy to get, even among intelligent people. I once remarked to a lady in my chair that she had been very sick with scarlet fever when she was about two years old. She was very sure she had not, for she had never been told of such an occurrence. When I explained that accurate knowledge of the facts was of considerable scientific value she said she would question her mother regarding it. The next day I received a note saying her mother's story agreed with my supposition, both as to the particular disease and the date of the illness. I have seen many of these cases, however, in which I could find no history of the illness causing them.—*Northwestern*.

TROPHIC DISTURBANCES OF THE FIFTH PAIR OF NERVES. By Harold N. Moyer, M.D., Chicago. Read before the Chicago Dental Society, February 2, 1904. The use of castor oil in the treatment of trifacial neuralgia originated in Gussenbauer's clinic in Vienna in this way: A common practice in that, as in many other surgical clinics, is to prepare patients by freely moving the bowels before operations. Many patients that came to have the Gasserian ganglion removed, or for some other operation upon the fifth nerve, would be given this preliminary treatment, the next day they would feel better, and a day or two afterward they were quite relieved of their neuralgia, and did not want to undergo an operation.

Before beginning the use of castor oil in the treatment of these cases I had arrived at a very simple and, as I thought, an adequate theory as to the derangements of the fifth nerve and the importance of the teeth in their development. It was based on comparatively few cases; one of them was a man with an acute neuralgia of the fifth nerve which extended to the infraorbital, but largely involved the middle branch. I examined his teeth carefully and found one exceedingly tender. He was taken to a dentist who removed the offending tooth, finding an abscess on the end of one of the roots. I told him that the trouble was found and that would be the end of the pain, but the neuralgia continued the same as before, in fact, it kept on getting worse, and he remained under my treatment for three or four months. This was before the castor-oil period of my

career. Obtaining no relief, he finally drifted into the hands of another physician.

I had a theory which seemed to fit these cases that the neuralgia was essentially neuritic, an inflammation of the nerve trunk that had its origin probably in some local infection commonly associated with the teeth, and even when one removed the offending cause complete relief might not be afforded because the neuritis had already traveled up the nerve and could not be relieved by simply removing a tooth. When it reached the ganglion then the trouble was central and incurable, and nothing but the removal of the ganglion was of any use. That theory was attractive because it was simple, and I think it is held to a considerable extent at the present time, but it does not explain the varieties of facial neuralgia which we meet. The inadequacy of it was brought to my mind by a recent report of an operation for the removal of the Gasserian ganglion. The surgeon who undertook that operation did not succeed in removing the ganglion. There was so much hemorrhage and shock attending the operation that he desisted, plugged the wound, put the patient to bed, and forty-eight hours later the patient had sufficiently rallied to be put on the table again, and an attempt was made to remove the ganglion. Again he failed because of shock and hemorrhage, the wound was closed, and the patient recovered. There was perfect relief from the pain which had persisted for more than a year, after which time she passed from under observation. This was an instructive case, and it thoroughly unsettled my preconceived theory of a neuritis developing from the peripheral portion of the nerve and traveling as far back as the ganglion and involving it. If the pain had been ganglionic it was unreasonable to suppose that if the ganglion were intact the pain would cease.

The literature records a variety of operations for the relief of trifacial neuralgia, all of which have had some success. The mere removal of the nerve itself has been followed by a number of cures, while it is largely condemned in works on surgery. I have known a considerable number of patients who have had the infraorbital or one of the dental nerves divulsed, and they have not had return of pain, at least not for a considerable period afterwards. These cases were not followed very long; one of them went three years without any pain, and after that I lost track of the patient. As a rule a mere section of the nerve affords only temporary relief, say for a few weeks or months.

A number of operations have been devised which are in part substitutes for the removal of the ganglion. Among the later ones is the suggestion of Spiller, that the sensory root be divided and the ganglion left intact. Two such successful cases have been reported. Spiller claims that there will not be regeneration of the sensory root and its division is equivalent to the removal of the Gasserian ganglion. It is a simpler operation; the difficulty is not in reaching the ganglion, but in removing it. Another ingenious modification of this radical operation is proposed by Abbe. Instead of removing the ganglion he makes a section of the three branches near the ganglion, and inserts rubber tissue and leaves it in place. The latter prevents reunion of the nerves or their regrowth. This operation has been successful in one case, and serves the same purpose as removal of the ganglion.

Of another series of operations I have been able to collect six unquestionably successful cases, the operations having been done upon another theory in regard to the development of neuralgias of the trigeminus. More than a year has elapsed without return of pain in any of the six cases. The operation consists in a removal of the superior cervical ganglion, simply an interference with the vasomotor nerve supply of the affected side of the head. A moment's reflection will take those cases out of the category of a neuritis extending along the nerve trunk and involving the ganglion; it is not reasonable to suppose that mere interference with the vasomotor supply or that governing it by such an operation as the removal of the superior cervical ganglion would result in a cure if the trouble were due to neuritis. There are some things in the history of these cases which would lead one to think that a disturbance of the vasomotor supply is not an infrequent cause of this form of neuralgia. In some of them the pain comes on suddenly; it is epileptiform in character; the face or head is flushed; sometimes the pulse is distinctly accelerated, and vascular pressure is increased. Occasionally the symptoms are reversed; the skin is pale and cold, showing a spasm of the peripheral vessels with diminution of the blood supply.

The group in which there is vasomotor disturbance includes the larger number of cases, and it is the group in which the castor-oil treatment is most efficient. No one who has given the castor-oil treatment a fair test will question its value. It will not cure every case, but two-thirds will be benefited, and of this number one-half

will be almost cured, that is, they will go from three to eight months without return of the pain, and frequently with the recurrence of the pain the same treatment will result in further relief. A reasonably perfect cure is effected in about one-third of the cases. I think this central idea of a vasomotor disturbance is the one that explains the effect of this eliminative treatment. There is nothing specific in the castor-oil treatment; other cathartics are good, but castor oil is the best, providing it is persistently used.

What is the explanation of the effect of the eliminative treatment? Only one to my mind, and that is an autointoxication, the presence of some substance in the blood, possibly absorbed from the intestines, or elaborated somewhere in the glandular structures of the body, which this persistent and copious catharsis abates. If it cures the neuralgia, does it cure the neuritis? It does not seem that such deduction is logical. The only possible way of getting rid of the deleterious effect of the substance or substances which cause neuralgia would be in altering the vasomotor supply of the affected region, and if you think for a moment of the intimate relation that the sympathetic or the vasomotor nervous system has to the vascular supply of the side of the head, and the vascular supply intimately related with these ganglia and with the nerve trunk itself, you will agree that they probably play an important part. The branch from the sphenopalatine ganglion furnishes abundant nerve supply to the carotid plexus, which is closely related to the ganglion on the fifth nerve and is intimately associated with the superior, middle, and lower cervical ganglia. The removal of the superior cervical ganglion has proven of value in glaucoma, exophthalmic goitre and trifacial neuralgia. It is obvious that the effects of the operation are due to an alteration in the blood supply.

I have briefly given an outline of my views as they have evolved in the years in which I have treated this class of cases. I have come to have a broader idea of this disease than a neuritis, one which becomes central and incurable. You may ask, "Do you reject the neuritic theory?" Not at all. I believe there is a certain group of these cases which falls within my original conception, that is, of a disease which starts in the peripheral ending of the nerve, which travels up as a neuritis, and ultimately involves the ganglion. I believe they comprise ten per cent of all cases as we meet them, and they are alone remedied by the more severe surgical operation of

removal of the ganglion or section of the nerve roots.

I now come to a part of the subject which more particularly concerns you as dentists, and my preliminary remarks largely lead up to what I shall have to say as to the origin and mechanism of the neuralgias. Much has been written upon the reflex origin of disease. I scarcely use that term, and never unless I qualify it with some adjective. The term reflex as applied to a disease entity has come to convey to different minds such a wide and varying conception that it is profitless to employ it.

A considerable number of reflex diseases or disorders are claimed to have their origin in the teeth from irritation of the fifth nerve. I have examined many of the reported cases, but have not had time to fully classify them. A large number of ocular disturbances have been attributed to disorders of the teeth. One case of total blindness is said to have been relieved promptly after the extraction of an offending tooth. There are many cases of this kind, running all the way from diplopia to more or less impairment of vision and pain about the eyes. Comparatively few of these cases will stand analysis. The one of total blindness was clearly a case of hysteria. There are some other cases reported of pain and redness of the eyelids, which were relieved by the removal of offending teeth.

In another group of cases aural disturbances are referred to. One writer reports fifteen hundred cases of aural disease, and of this number he says one-third were attributed to disturbances in and about the teeth. This man must have had a singular experience in ear diseases, and one can hardly accept these figures. That certain disturbances of the ears, such as ringing in the ears, or possibly spasms of the Eustachian tubes, may be due to reflex causes is probable. Facial twitching has been relieved by the removal of carious or abscessed teeth. Many of these cases have a better basis than the ocular or aural disturbances; most of the latter will not stand a careful inspection of the histories.

A still larger work has been done in France by Jacquet, one of the most enthusiastic students of the whole subject of reflex disturbances and trophic disturbances growing out of diseases of the fifth nerve and their relation to the teeth. His work is interesting and will stand rigid scrutiny. His published cases amount to two hundred. He states that baldness is occasionally due to reflex disturbances, particularly alopecia areata. He studied the relation of

dental irritation to certain hyperesthesias, erythemas, and painful points and other trophic disturbances about the face and scalp. He found among two hundred of his cases baldness in twenty-seven, which were in his judgment clearly due to disturbances of the teeth, and he furnishes an interesting plate which shows the portions of the scalp and face which were associated with disturbances of special teeth. A common relation was the cuspid tooth upon the same side, with disturbance about the side of the nose, or the development of baldness just at the margin of the hair. The back teeth were frequently associated with baldness of the occiput.

Of late years the so-called reflected pains have been studied in different parts of the body. Dana fifteen years ago gave a classic description of the reflected pains of the body. He showed how pains on the surface of the skin were associated with various diseases of the internal organs. In this study he was followed by Head of England, who found that with inflammation of the gall-ducts, the kidneys, and of the appendix, there are certain areas of hyperesthesia. A writer in a recent number of the *Lancet* gives a description of the hyperesthesia of the skin that occurs in appendicitis, and in a majority of the cases he has been able to determine—not tenderness upon pressure, but by simply irritating the skin with any little instrument, like a pin—that there is detected an area of hyperesthesia that corresponds with the spinal segments which are in direct relation with the nerve supply of the affected part.

That is the invariable rule, and is to my mind the strongest evidence of the correctness of these deductions regarding the relation of the teeth to disturbances in the trophic supply of the face. If these deductions are correct we are brought to the practical bearing of the subject. I venture the assertion that a large share of the disorders, both trophic and painful, of the fifth nerve have their origin in the teeth. I know that I am carrying coals to Newcastle when I tell you this, as you have observed many such cases. Let me urge those of you who treat diseases of the teeth to broaden your clinical investigation of your cases somewhat, as this is an important matter. I urge you to watch your cases in the next three or four years, and investigate what trophic disturbances your patients may have besides those associated with the conditions you find in the mouth. Unfortunately those of us who devote particular attention to the nervous system do not see many of these cases. I have seen

but one in the past year. I had one woman, whose boy I was treating, who called my attention to an eczematous patch at the scalp margin. I said to her: "How are your teeth?" She replied: "I have had a tooth treated on this side." No doubt there was a causal relation in this case. Those of you who see the teeth first should broaden your clinical investigation of the cases; see if there are any trophic disturbances about the face, if there is an erythema, a baldness, or tenderness which may be due to the conditions that are taking place in the mouth.—*Review.*

PULP AS A FACTOR IN TOOTH PRESERVATION. By William A. Morrison, M.A.C.D., D.D.S. Read before the Southern Dental Society of New Jersey, March 16, 1904. I would refer to the treatment of the dental pulp, in endeavoring to preserve the functional utility of the teeth, under certain specific conditions, which conditions will be discussed after we have considered the function of the pulp in relation to the structures with which it is anatomically associated.

Pulpal Activity.—Primarily the dental pulp is a formative organ, and any other duties that may be attributed to it must necessarily be considered as of merely secondary importance in comparison with this function. When we remember that it is from the pulp that the dentin is created, through the agency of its superficial layer of odontoblasts, it will be obvious that destruction of the pulp necessarily implies stoppage of dentin formation, and a destruction of the individual odontoblastic cells means a cessation of dentin production at the point where such destruction takes place. In the tooth-crown the active process of dentin formation and, indeed, of calcification, is practically completed before the tooth's eruption. Thereafter this portion of the tooth increases in density only in a comparatively imperceptible degree as old age is approached, unless, of course, it is subjected to abnormal and undesirable conditions. These facts, familiar to us all, are referred to only in view of the importance that attaches to them in certain therapeutic procedures which will now be discussed.

Conservative Technique.—In every operation upon a live tooth the question of the safeguarding or disposal of the pulp is the consideration uppermost in the mind of the operator, and his method of treat-

ing any tooth along conservative lines is necessarily governed by the decision he arrives at on this point. In filling operations, for example, where carious processes have not closely approached the central organ, the dentist shapes the cavity in such a manner that any pits or grooves made for retentive purposes shall not do so either. Where the stage of tooth destruction is further advanced, so that the pulp is closely approached in the removal of affected tissue, he adopts special measures to insure its protection from any injurious results consequent upon his operations. The precautions referred to in both these instances are observed for two reasons: firstly, to avoid unnecessary extension of the operation; secondly, to avoid endangering the vitality of useful healthy tissue. Under ordinary circumstances there is but little difficulty in recognizing what should be the correct procedure where caries has not reached the stage known to us as *complex*, but where this condition is presented, when the dental pulp has suffered exposure—either through the progress of advancing disease or our own efforts to remove the affected tissue—then it is that many of us are uncertain how best to proceed.

Radical Treatment.—Why is this so? Since all therapeutic processes are “a compromise with existing conditions,” why does not the operator effect his compromise to the best advantage? Especially in those cases of exposed pulps in full-formed teeth why does he not decide the question once and for all, and treat the condition in the only way which gives assurance of satisfactory and permanent results? I submit that every exposed pulp in a fully-formed tooth should be removed.

Again, in the domain of crown and bridgework we find many ingenious forms of crowns suggested for the purpose of restoring the shape and bulk of the tooth, and at the same time preserving—doubtfully preserving—the vitality of the pulp, when the reproduction of the size, form, and function of the injured organ would pass from the realms of mere probability to the regions of practical certainty if future complications of the pulp were rendered impossible by removing it, and the operation done once and done well. With bridges, when the natural teeth are of necessity more or less mutilated for the purpose of securing suitable abutments, it would seem preferable in almost every instance to remove the pulps of the principal supports at the outset, for wherever the possibility of future pulp trouble, such as irritation, inflammation, or infection, is invited by

affixing a cap to a root containing a live and delicate pulp the wrong course of treatment has been followed. It is wrong, because when we leave a live pulp in a bridge abutment covered with a shell crown we are endangering the thoroughness and permanency of our work and taking an unjustifiable risk of future complications, which will probably produce worse conditions than those originally treated.

Theoretical Considerations.—There are doubtless some to whom my remarks will seem too radical—too extreme—to be the expression of an honest conviction. Accordingly, in the hope of engaging the discussion of those of my hearers who can speak from a more extended experience than my own, I shall endeavor to present the reasonings upon which those statements have been based.

Capping.—In the first place, with reference to filling, the only alternative treatment to that of extirpating an exposed pulp is the operation known as capping. This may be defined as the process of replacing the missing portion of the pulp-chamber wall with a non-conducting substance prior to filling the cavity in the ordinary way. It has for its object, I understand, the protection of the pulp as far as possible from external influences, so that the missing wall may ultimately be restored by the formation of new dentin. Do we know what chance a naked and susceptible organ such as this has of escaping infection from the instruments, the débris of the cavity, or at times the saliva? Do we know that an injured and delicate tissue such as this is capable—even in a sufficient number of cases to yield a majority of favorable results—of overcoming both the original wound or lesion and the continuous contact of a foreign substance? And finally, do we know that there exists even the bare possibility of the missing pulp-wall being replaced by new dentin, when the surface cells of the pulp at that point have already been destroyed—the only cells from which new dentin could possibly be formed? On the other hand, suppose we determinedly refuse to lean upon this broken reed called capping, and pursue the radical line of treatment in the cases under consideration, how much happier are we in our own work's results! By the use of cocain hydrochlorate the pulp is removed with little or no discomfort, replaced with a permanent antiseptic filling, and we have not merely a chance but a practical certainty of satisfactory and successful results.

Is Caries Predisposed?—Against this treatment it may be asserted that when the pulp is destroyed the dentin is no longer vital, and the

calcifying process, always normally going on, is stopped, so that the tooth no longer increases in density with time, and is consequently more susceptible to the ravages of caries than if the pulp had been maintained alive. To effectually dispose of this argument it is only necessary to remind you that susceptibility to dental caries does not depend upon the density or hardness of the tooth's structure, nor upon the percentage of calcium salts present, but upon the environment to which the tooth is subjected, and that environment obviously cannot be influenced by the pulp, whether that organ be present or absent, alive or dead. I repeat, therefore, in cases of exposure extirpate the pulp, for it is clear that the retention of an exposed dental pulp, capped or otherwise, does not in any way assist us in the ultimate preservation of the fully formed tooth. (These remarks do not refer to the deciduous teeth, which serve only a temporary purpose, and are accordingly treated on special lines.)

Vital Abutments.—Reverting to the other department of restorative practice referred to in the foregoing remarks—crowns and bridgework—arguments may be advanced against the destruction of pulps in abutments, to the effect that such a course produces a chronic excess of blood supply to the pericementum, and that such a disturbance of vascular conditions in this tissue predisposes it towards pyorrhea alveolaris and early loss of the root. Were such the case bridgework would indeed be of questionable utility and of doubtful propriety, and yet the statement at first glance seems plausible. Seeing that the vessels to the pulp and the pericementum come from a common trunk, is it not rational to suppose that removal of the pulpal arteries would cause their share of the blood supply to be diverted to the pericemental vessels, so that the latter would receive an excess? Possibly such is the case, but it is difficult to believe that the increase from this cause can be other than purely temporary. If we cut off our thumb, do the fingers that remain receive a dangerous excess of blood supply for the rest of our life? I hardly think so, and as in this case so in the matter of the pericementum; the unusual distention of the vessels will cause impulses to be sent from the vasomotor centers to constrict the arterial walls, so that the blood supply to the pericementum is very soon reduced to neither more nor less than is required. Should, however, this reflex action still be doubted and an increased blood supply to the pericementum still be asserted, all on account of an extirpated pulp, that very cir-

cumstance itself would be sufficient justification of the pulp's removal in abutment, for a root serving as a pier-tooth has to do the work not of one tooth only but of several; its pericemental function is increased, and an extra supply of nourishment becomes not an element of danger but a probable necessity. My contention, however, is that any continuous extra blood supply is induced not surgically but physiologically.—*Brief.*

SUGGESTIONS IN DENTAL RECORDS, BOOKKEEPING AND NOMENCLATURE. By H. T. Smith, D.D.S., Cincinnati. Read before the Ohio State Dental Society, December, 1903. In regard to nomenclature, I have for some time thought that our words for expressing and for recording the degree of penetration of caries in tooth substance have been somewhat deficient. In attempting to accurately record these stages of dental caries I find that we have practically only two terms, "superficial" and "deep-seated." To indicate the other stages, with more or less involvement of the pulp, the use of entire phrases and sentences is necessary, as "pulp nearly exposed," "pulp quite exposed," etc. The profession need not be so impoverished of ideas, and especially in regard to that one disease, the treatment of which claims the major portion of our time. It certainly deserves the most complete and definite nomenclature possible.

As a precedent, what have we in general *materia medica*? There we find a certain prescription for burns of the first degree, and a different prescription for burns of the third degree, indicating that there is a definite nomenclature for burns, and yet the demarkation between those degrees is not *more* definite than between the different stages of dental caries that we might formulate.

A definite dental nomenclature seems to date back to the time of the World's Columbian Dental Congress in 1893, when Doctor Black presented his essay upon the subject, and he called attention to the fact that there was at that time in use among the French dentists a nomenclature of dental caries. A modification of that scheme, according to Dr. Julio Endelman, is the one at present in use in France and elsewhere on the continent, and it is this nomenclature that I suggest for adoption. The scheme is briefly the classification of the penetration of dental caries in tooth substance into four principal degrees, as follows: Caries of the *first degree* is that in

which the enamel has become decalcified, the disturbance being limited to the enamel tissue. Indicated—Caries 1°. Caries of the *second degree* is that which affects the enamel and dentin, the pulp being as yet protected by a sound layer of dentin. Indicated—Caries 2°. Caries of the *third degree* is that in which the carious process has penetrated to the extent of nearly exposing the pulp, this being covered by a softened and infected layer of dentin. Indicated—Caries 3°. Caries of the *fourth degree* is that in which there is an actual exposure of the pulp of a greater or less extent, including all the stages of inflammation and putrefaction of that organ. Indicated—Caries 4°.

Paul Dubois has further subdivided the fourth degree of dental caries into five different stages, designated as 4¹, 4², 4³, 4⁴, 4⁵. Thus: 4¹. Pulp disturbances of a slight degree, causing pulpitis. 4². Infection of the canals, without affecting the pericementum. 4³. Infection of the dentinal canals and apical space, causing slight pericementitis, subacute or chronic. 4⁴. Infection producing slight alveolar disorders, gingival fistula, or alveolar abscess of moderate intensity. 4⁵. Infection producing serious disorders, acute or chronic pericementitis, with suppuration, pericemental cysts, and reflex disorders.

The advantages of such a system would be several. In our dental schools it would facilitate descriptions and enable the student to associate recognized forms of treatment for different stages in the progress of dental caries. In the papers and discussions of our dental societies the same advantages would obtain, increasing the facility with which they could be understood by us and by foreign dentists. Also, the increased facility with which we could record operations and transcribe the history of cases would be quite worth while.

The system of nomenclature just presented might be changed in some of its details, and modifications would perhaps suggest themselves to us all, but with a little study it will be found that on the four principal degrees the stages of penetration in the progress of dental caries are concisely covered. The further division of the fourth degree is somewhat arbitrary, but it seems to cover the various stages of pulp infection and sequelæ. If we aim at universality in dental nomenclature, and that should be our object, the scheme could be used as it is with advantage.

There is one other suggestion in nomenclature which might be made, the adoption of the words "curet" and "cureting" into our dental vocabulary. If I remember rightly, Dr. M. L. Rhein mentioned the terms a year or more ago. I would suggest that "cureting" be made to indicate that part of the surgical treatment of pyorrhea alveolaris which consists in the scraping of the roots of teeth. It might include the process of removal of calcareous deposits from any part of the teeth, but should perhaps better be confined to the instrumentation of the roots. That would distinguish the ordinary removal of calculus with the scalers above the gingival line in the process of cleaning teeth from the more thorough scraping or cureting of the roots in the treatment of pyorrhea. We would then have a distinct class of pyorrhea instruments known as dental curets. In our dental records the term cureting would be useful as indicating a definite operation.

The bookkeeping system which I have to present is briefly the adaptation of the loose-leaf ledger system, now so commonly used in mercantile houses, to the needs of the dentist. The diagram of the teeth is one that I have revised, and to the records commonly kept I have added spaces for "Saliva Test," "Temperament," and for "History of the Case." The page is nine and one-half by eleven and one-half inches in size, and is ruled with a double column for accounts, giving about sixty lines. The W. B. Carpenter Co. of Cincinnati have made this copy for me and will make additional copies for any dentist who will send for them.

DISCUSSION. *Dr. S. D. Ruggles:* I find it quite a burden at times to transfer records from my Allen blanks to my ledger, for the average assistant cannot be relied upon, and the laws of the state accept none but the original record. The card system idea the doctor has incorporated with his scheme is a great saving of time. You will notice that no provision is made for the records of deciduous teeth, therefore I would suggest the addition of a small diagram in a different colored ink.

Dr. J. R. Callahan: Doctor Smith spoke of making a record of your cases on a slip, and handing that to your bookkeeper, or laying it on the desk. That becomes your original account, and when you go to the court, and the court asks for the original account, you haven't got it, and your ledger cannot fill the bill, so it has been my practice to make my ledger account the original account, and I can

swear to that in court. It seems to me that this is an important item.

Doctor Jones: There are just two things that I would add—a place allowed for registering the temperature and the condition of the saliva. We all know that the decay is only a local evidence of the condition of the patient's health, and it is a nice thing to know what the saliva test is this year and what would be the experience a year later. Probably the conditions are altogether changed, and you would alter the treatment.

Dr. W. H. Todd: I think a system of this kind is almost absolutely necessary in dental practice. I want to speak of the nicest thing I ever had in my office. I found in one of our stores a book that has every day divided off. The book is left on the desk, and the young lady opens it at the day of the month, and every person who enters my office she puts his name down, and not only that, but the time when he comes into the office, so that if there is a dispute about the time the record is there. If there is a telephone message it goes down, and at the end of the day I can look over this, and if I have missed any charges, or any telephone messages, or missed somebody, I find it right there, and many times I have saved twice the price of the book in one week by finding out that there was a treatment I didn't charge for.

Doctor Wilson: This little book that Doctor Todd has presented has a splendid feature. There has been a good deal of thieving around dental offices, and if the name of every person who comes in is put down there may be some chance of finding out where these thieves are.

A Member: I am charmed with Doctor Jackson's method of recording. He uses this arrangement when a patient comes in: In his reception-room there is a desk at which a stenographer sits, and while he is talking about the case the stenographer takes down the conversation, at least the salient points of it, and it is a permanent record and could be used if necessary. There is a great deal of misunderstanding sometimes as to price, etc., and many other things we might think of that would be proper in a record.

Doctor Barnes: The only thing I would suggest in taking saliva tests is that the time of taking test be given, whether in the early morning, noon, after dinner, or just as the business of the day is closed, because there is a difference. I think that the dot system of general record would make this more valuable, because you would

be able to place upon one line all the operations of a single side, whereas if you had three or four different operations you would have three or four different lines covered. You could have places for gold—and it is well to put down the kind of operation you perform, because you want to know for all time to come how long certain fillings have lasted in certain mouths, and how often decay is recorded. If you have any space at the right of card for remarks, you can use it. I have on my card, which I have changed some from the dot system, D. C. F., which indicates the pulp was destroyed and canal filled; A. B. C. F., which means abscess and canal filled. You can refer back to this part and have no trouble. I have each operation as a particular schedule, and if patients ask me the number of operations, I have it there for the last twenty-five years.. I have the original record on a pad attached to a book. My assistant takes that from the pad, which is bound in stiff covers, and in this book is placed the time when that was commenced, and the time it closed, and she makes the record when the day's work is done, and when that book is full those are filed away so that we have no trouble at getting at the original record, and there is no reason why it should not be adopted in the card system.

Dr. Smith: In regard to original accounts, the statement was made that the transferred account was not valuable in a court. That is true. It is the original entry, so-called, which would be good evidence, and the idea I had was to make this the original entry and it would be of use before any court of law. This is well bound, and it could be filed away with proper dates, and there is no reason why we should not have the original data that might be asked for in court. Now, a dentist at the end of his day's way probably can remember just what he has done, what particular cavities were filled, and the condition of the patient, and there is no reason why he should not make an original entry in the ledger, and that will become the best evidence in a court. But it seems to me that to men who are working without assistants to make the records this is a nice way of making records and including the charges for the individual operation. The diagram being very much like that in the book gives an opportunity to transfer it exactly. My idea was that such a pad as that to make the charge on could be counted an original entry. Any method which a dentist has already adopted for keeping accounts could be brought into use with this system.—*Register.*

PERMANENCY OF THE TEETH AS SEEN FROM A STUDY OF COMPARATIVE DENTAL ANATOMY. By Robt. B. Howell, D.D.S., Ann Arbor, Mich. Dentists are inclined to think that all that is possible is being done to effect the permanency of the teeth. The public is more than ever before being brought to a knowledge of the necessity of having their teeth cared for, and the dentist of to-day, by the possession of a superior education, is saving teeth which only a few years ago would have been extracted by his less fortunate brother. In fact, so common has this *habit* of visiting dental offices become that every one may not agree with the writer in the statement that more teeth are being saved to-day than ever before in the history of dentistry. And, again, never was there so much done for the treatment of diseased gums and teeth and for the correction of irregularities to maintain the full-sized, normal jaw as at the present time. The question arises, does not the public rely too much upon the skill and ability of the dentist to relieve them of their troubles, rather than endeavor to do away with those erratic habits which cause dental diseases and deformities of various kinds? We might also inquire if the dentist is doing his full duty in an educational way.

As might be wrongly inferred from the title, it is not the purpose of this paper to discuss whether or not we are descended from that simple and insignificant spindle-shaped vertebrate, the amphioxus; nor is it the intention to enter into a dissertation on comparative dental anatomy, but simply to mention one or two truths which are discovered in the study of the latter, and point out their practical significance to the profession. In the study of all forms of vertebrates one cannot help noticing and admiring how perfectly they are adapted to their environment. Take the fish, for example, how admirably it is suited to the aquatic life; the head is so shaped that it forms the least resistance to the water; there is no neck, the head being united directly to the body and held perfectly rigid, forming a most perfect cutwater. The integument is also peculiarly constructed for this aquatic existence; it constantly secretes a mucus which protects it from the action of the water and enables the fish to move with greater speed. The scales are arranged so as to offer the least resistance. The eye is flat on its anterior surface and focused for near vision. Then there is the truly wonderful respiratory system, the blood being oxidized as it passes through the gills,

which are constructed of highly vascular processes, over which the water, containing oxygen, is passed. This most marvelous provision of nature, the appropriateness of all the organs of vertebrates to suit their surroundings, is seen in all other beings, such as the amphibians, reptiles, birds and mammals.

It is a well-known fact that any of these specialized organs may become rudimentary or entirely wanting if not used, this being brought about by a change of environment and consequently a change of habits. Darwin says: "Disuse at that period of life when an organ is chiefly used, which is generally at maturity, seems to have been the chief factor in causing organs to become rudimentary. It causes a lessened flow of blood to the part, and thereby lessens normal and functional development. Continued disuse thus weakens and diminishes any part of the organism." There is another law which should be considered, namely, that when any part becomes useless economy of growth enters in, and there will be no unnecessary expenditure of vital material in the construction of the useless part; the nutritive supply will go to some other organ where it is more needed.

A good example of this fact is shown in the whales, which are mammals that have taken to the water and become fish-like in form and structure, the anterior limbs becoming like the pectoral fins of a fish and the hind limbs being lost entirely. The most striking example in the life of one family is seen in that of the *suidæ* or hogs. On the wild boar there are long and powerful limbs, which enable him to run with greater speed than a horse. The ears also are large, and the sense of smell is very acute, to enable him to scent and hear approaching danger; and since the animal is required to *root* for a living, and as his chief means of defense is by his mouth, it becomes necessary for him to have developed a large and very muscular head and neck, with a correspondingly powerful pair of jaws, containing the tusks and teeth characteristic of the boar. Now put this animal through a process of domestication and see what happens. He loses all the above characteristics, or at least they pass through a state of degeneration; his legs become shorter and less muscular, his ears smaller, and undoubtedly his sense of smell less keen; and since through the kindness of man he is no longer required to root for a living, his tusks become much smaller and his jaws less muscular. The specialization of parts is shown more strikingly in the organs of

mastication probably than in any other, and as seen in the boar there will be marked degeneracy due to like causes.

If the mechanism for the reduction of food of the vertebrates be examined it will be found that it is confined almost entirely to the oral cavity. In the lower forms the teeth are supported upon the various bones and cartilages in and about the mouth; they may be found in the thorax, or even in the esophagus, as seen in some of the snakes. In the higher forms they are supported on the maxilla and mandible. This great diversity of form and characteristics of the teeth is due to two causes; first, to food selection, and second, to jaw movements. There is no doubt that this variation is influenced by the qualities of the peculiar substances which are used by the animals for food. Each species requires a certain kind of service for the reduction of its food. As has been aptly said, "it is an adaptation of tools to material, and not of material to tools." Proof conclusive of this fact is found by a study of the ancestors of various animals, comparing their teeth with those of their descendants which have been obliged to take up a different mode of life or cease to exist.

In fishes and snakes, where the teeth are merely for retentive purposes, there being no mastication, they are of simple conical form, and usually extend backward in the mouth, in order to more certainly secure their prey. In the herbivorous mammals the teeth are much enlarged laterally and strengthened so as to resist the lateral strain which arises from the grinding motion of the jaws of these animals. Lastly, in the carnivora, which have the simple up-and-down hinge motion, the teeth are developed vertically, with long points or cusps extending in the direction of the resistance to the greatest strain. The jaw movements also influence the teeth. In the herbivora there is that peculiar grinding motion, and the temporo-mandibular articulation is peculiarly constructed for that purpose. In the carnivora there is the one simple vertical movement, and consequently the temporo-mandibular articulation is a hinge joint allowing the one motion. Now, in the examination and study of the order of primates we find similar characteristics. The teeth are of such form as is peculiar to a mixed diet and the owners are therefore termed omnivorous. The temporo-mandibular articulation is also of such a character as to allow both the vertical and the lateral movements of the jaws. The

food of aboriginal man was of a mixed character, and his teeth were made for grinding, tearing and incising.

In view of these facts, what can be said of the human race? All the leading evolutionists of the day agree in the statement that the races of mankind are undergoing a rapid evolution. Man is making for himself a new environment. The old adage, "Early to bed and early to rise makes a man healthy, wealthy and wise," is relegated to the past. In fact, it seems that a man to now accomplish anything of importance or to achieve success must work the greater part of the night. Less sleep and rest seem to be necessary. Whereas a business man of a few years ago would go to his office and spend the entire morning reading over his mail and the rest of the day answering the same, he now arrives about 9 o'clock, glances it over, dictates answers until about 10:30 or less and has it completed and in the return mail before the morning is over. This is necessary for him to exist in the business world. The man of twenty-five years ago would now be swamped the first day.

All this has its effect upon his physical development. Nature in her efforts to alter man's organization to keep pace with these rapid changes is doing her level best, and we cannot be surprised at some of the freak specimens of mankind which are occasionally produced. The increased amount of brain work or mental exercise has caused the development of the brain to an enormous extent, and this in turn requires a larger brain-case; and through faulty habits of living, bolting and eating of predigested foods and lack of bodily exercise, the body does not get its proper amount of nutrition. In order to produce this enlarged brain-case it must be done at the expense of the lime salts which would go to the other portions of the osseous system, and principally to the jaws. This may be proved by an examination and comparison of the jaws of apes with those of man, or even the latter with those of the lowest races of mankind, which will show a marked degeneration both in size of jaws and number and size of teeth. In truth, the reduction of jaws seems to have kept pace in an inverse ratio with the development of the brain and consequent enlargement of the brain-case. If the jaws of an infant ape and man be placed side by side a striking resemblance will be noticed, but in the adults we find a prominent development in that of the ape and a relatively unsatisfactory one in that of man. Dr. Talbot and many others have made ob-

servations demonstrating that the human jaw is growing smaller all the time. This is also shown in the degeneration of the third molar.

To come to the practical part of this paper, What is the dentist going to do, or can anything be done to better this condition of affairs? A great deal can be done, and it is principally in the way of educating the public. Although the dentist has his practical procedures to carry out, he is also responsible both in a direct and indirect way. The necessary procedures might be classified under four general heads: 1. Proper selection of food and mastication of same, both for infant and adult. 2. Proper care of the teeth. This embraces the mechanical cleansing by the aid of the brush and powder and pick or thread, also chemical cleansing by means of antiseptic mouth-washes and operative procedures of the dentist which may be necessary for the cleansing of the teeth and eradication of caries. 3. Proper orthodontic procedures to maintain the full-sized and well-formed dental arch. 4. Retention of the teeth, both deciduous and permanent, in the jaws for their full time.

It has been shown that man's food should consist of that which requires thorough mastication, and in order to accomplish this it will be necessary to eradicate two present great evils. The first is that of bolting the food and then dosing with some digestive remedy to assist the stomach in performing a function for which it is not organized. Dare it be predicted that if this continues, man of future generations will have developed a craw and gizzard like the birds for the purpose of carrying out the function which has been taken from the teeth, to their threatened degeneration? The other equally serious habit is that of filling the stomach with a food which has been both masticated and digested. This can certainly be called the age of predigested foods. Men do not get up early enough, are too busy at noon, and too tired at evening to take the time to properly eat a meal. The writer on one occasion heard something like the following remark from a man of more than average intelligence: "I wish the day would come when our food could be prepared in tablet form, so we would not have to waste so much time as is now done at meal hours." This seems to be a prevailing sentiment. What is to be done? This question can be answered by a very homely but suggestive phrase—man must get back to the woods, or at least to undigested food.

The time to commence this campaign of education is immediately after the birth of the child. Give it the mother's milk if possible, which is its natural food. Do not raise it on artificial foods, for the disturbances to the digestive apparatus of the infant which are bound to occur will inevitably exert an ill effect upon the structure of the undeveloped crowns of the teeth. After the temporary teeth are erupted give the child a crust of bread occasionally to gnaw; if it gets it once it will certainly cry for it again. When the age is reached that the child can be made to understand and reason, then teach in the home, school and dental office the importance of thorough mastication of the food in order to give the teeth and jaws their full amount of exercise for growth and to allow the saliva to do that portion of the digestion for which it is made. By so doing good habits will be formed which will more than likely be carried through life.

Under the second division, in order to have a perfectly developed jaw it is necessary to have a perfect dental apparatus, which is not possible unless the gums are healthy and the teeth free from caries. For this requisite it will be necessary, then, to take the best care of the teeth and mouth. This will consist in a thorough cleansing of the teeth by the aid of a brush of the proper shape, correctly applied with a good powder, augmented by proper use of a thread or toothpick, and since bacteria are the cause of such destructive diseases in the mouth, it is very essential that some good antiseptic mouth-wash be used, always according to the direction of the dentist. Following this come the operative procedures for the cleansing of those deposits on the teeth which cannot be removed by the other methods and which have such a predisposing tendency to pyorrhea. Lastly is the importance of operative procedures on carious teeth.

The importance of the third division, "Orthodontic Procedures," is often overlooked. Although, as stated in the early part of this paper, there is probably more of this kind of work being done than ever before, yet the reason in the great majority of cases is entirely for its esthetic value. Mothers do not like the looks of their children's teeth, consequently they have them straightened. The dentist of to-day has an important duty in teaching parents the necessity of having all malocclusions of the teeth corrected, in order to maintain the well-formed jaw and place the teeth in the

best possible position to perform their functions in the most effective manner and escape caries. The fact that this adds to the external appearance of the face should be one of the least considerations.

The last division, "The Retention of the Teeth," is one which has been much discussed and written upon. There is, however, hardly anything which can be said in support of the extraction of the teeth, the most common sufferers being the first molars. The prevailing argument to support it is the best which can be used against it. Are these words familiar? "If the first molar be extracted before the twelfth year the space will entirely fill up by the second molar moving forward and the teeth in front giving back slightly." This is exactly what is not wanted; it is this enforced contraction of the jaws which produces a deplorable state of affairs. Leave all the teeth in as long as anything can be done to save them; fill with amalgam or cement, or crown—anything to maintain the full number of teeth. It is hardly necessary to mention the exigency of retaining the temporary teeth so as to insure a regular permanent set. Fill them, even if it is necessary to remove the pulp and fill the pulp cavities. It is better, however, to watch them carefully and endeavor to fill the cavities while they are small, especially cavities on the proximal surfaces.

If the average dentist of to-day carries out the outline as given in the above four divisions to the best of his ability and judgment there will be no cause for alarm for the dental apparatus of future generations, and much will be done to elevate the profession to as high a standard as could be desired.—*Register*.

ALVEOLO-DENTAL MEMBRANE: ITS MINUTE STRUCTURE FROM A PRACTICAL STANDPOINT. By I. L. M. Waugh, D.D.S., Buffalo. Read before the New York State Dental Society, at Albany, May 13, 1904. You will concede that a full knowledge of the minute structure of any tissue in health is essential to its most intelligent treatment in disease. I shall concisely review the histology of the alveolo-dental membrane, and shall endeavor to call attention to its practical bearing in a few of the more important considerations which concern us in our everyday work. The alveolo-dental membrane is the connective tissue layer which serves to invest the root of the tooth and line its alveolus. The origin

of this tissue is from the outer layers of the dental sacculus. It varies markedly in thickness in different teeth and in different parts of the same tooth. It is thickest at the cervical portion, becoming thinner in the middle part of the root, again increasing toward the apex, where it assumes a considerable thickness. In the normal tooth and some pathologic conditions it is generally more closely adherent to the cementum than to the alveolar wall. The removal of part of the alveolus in tooth-extraction is frequently due to this condition. It is rich in nerves, blood-vessels, lymphatics, and glands. It is thicker, more highly vascular, and of greater elasticity in youth. After middle life it gradually loses these qualities, until in old age the tissue has undergone modification to a marked degree.

Functions of the Pericementum.—Its duties may be divided into three classes: (1) Functional; (2) Physical; and (3) Sensory. The *functional* embrace (a) its nutritive and (b) its formative duties. It nourishes the cementum, and in part the alveolar wall through the agency of its copious vascular supply. Its formative function is that of building bone on one side and cementum on the other. This is performed through the agency of certain of its cells. The *physical* office is (a) that of retaining the tooth in its socket; and (b) its cushion action. These are effected by the principal fibers of the membrane. The *sensory* function is brought about through the agency of the nerves which abundantly supply the tissue.

This membrane and its product, the cementum, are the only *true* tissue formations entering into the make-up of a human tooth. The essential elements of a tissue are (a) cells and (b) intercellular substances properly intermingled. In enamel and dentin there exist no living cells. In the dental pulp there are cells and intercellular substances, but these are not sufficiently formed or properly associated to constitute a true tissue.

Its Cellular Constituents.—The cells are (a) osteoblasts, (b) cementoblasts, (c) fibroblasts, (d) osteoclasts, (e) epithelial cellular bodies, the function of which is yet imperfectly understood. *Osteoblasts* are active in the formation of a portion of the alveolar wall. They are found on the outer or bone surface of the membrane, intermingled with its principal fibers. They are much more abundant during the development of the alveolar wall, and at this

period are closely packed over the whole surface, but as age advances they diminish in number and size and become separated into groups. This has a practical bearing in the extraction of misplaced teeth, as, for example, when found upon the hard palate, in the nasal cavity, in the floor of the mouth, etc. It has been claimed by some that the removal of such teeth is accompanied by grave danger of seriously injuring surrounding parts, as tearing out the bony structure of the hard palate, or if in the nasal cavity, the removal of part of its floor or bony walls, etc. There is an alveolus formed wherever a tooth is erupted. With reasonable precaution serious accident need seldom be feared, as the alveolus is amply resistant and sufficiently strengthens surrounding bony parts to reduce the danger to a safe minimum.

Cementoblasts are irregular cells found on the opposite side of the alveolo-dental membrane from the osteoblasts. They also lie between the principal fibers, forming a closely-packed layer which persists, the cells not separating into groups. There is an almost constant variation in quantity of the cementum of the same tooth within physiologic limits. In the extensive moving of a tooth, as in orthodontia, there is partial resorption of the cementum in the area upon which great pressure is brought. A building up of this tissue takes place in the zone of attachment of the principal fibers which are put under tension, or in other words, those which directly resist the movement of the tooth. The cementum remains alive so long as its surrounding membrane is vital. In fact, all of the enamel and nearly all of the dentin may be removed and yet one may by judicious treatment build upon the remnant of the tooth an artificial substitute which with ordinary care will do excellent service for many years. When the alveolo-dental membrane is once destroyed the tooth is lost, no matter how nearly perfect may be the other tooth structures.

Fibroblasts are spindle-shaped cells which are active in the increase and renewal of the fibrous elements. They are distributed to all parts of the membrane and are constantly undergoing change.

Osteoclasts are large multinucleated cells whose function is to disintegrate calcified tissue when that becomes necessary, as in change of occlusion, whether due to an effort on the part of nature to duplicate a type, or to extraction of surrounding teeth, orthodontia, etc. They are followed by the *x* "blasts" or builders of the

respective hard tissue. They are probably almost constantly at work to at least a slight degree.

Fibers.—The principal fibers are the elements which actually hold a tooth in its socket. Their course varies greatly in different parts, and considered as a whole their arrangement is complex. They are of the white fibrous variety of connective tissue, the elastic being absent, or if present are of such minute quantity that attempts at their demonstration have so far been unsuccessful. They extend from the cementum on one side to the alveolar wall on the other. They pass directly into these hard structures for a variable distance at either extremity, by this means strongly suspending the tooth in its socket. The portion of the fibers which penetrate the calcified tissue are known as "Sharpey's fibers." While in general the direction of the fibers may be said to be transverse, their course varies somewhat in different parts. The main bulk lie parallel with one another except where they deviate to make room for vessels and nerves. In the gingival portion they pass out either directly or divide into small bundles of fine fibers. Upon the labial, buccal, and lingual surfaces of the gingival portion they pass directly into the fibrous tissue of the gum. On the mesial and distal surfaces those beyond the alveolar border join with the fibers of the neighboring tooth. Fibers from this membrane assist in the formation of the free margin of the gum throughout its whole extent. The term "dental ligament" has been applied to this portion.

The fibers near the alveolar margin join with the periosteum covering the outer surface of the alveolar process. The fibers immediately within the alveolus are inclined from the cementum slightly toward the apex, while those of the middle portion of the root pass perpendicularly across. The fibers of this part are the shortest, largest, and strongest. As the apex is approached the fibers on the lateral aspect tend to incline crownward from the cementum. As the fibers pass from the apex they radiate in this portion, frequently breaking up into flattened fasciculi.

The slight normal movement of the tooth in its socket is not due to the elasticity of the fibers, but to their many directions and curving course in some localities, so that very slight movement is possible without any principal fibers being on actual tension. The arrangement of the fibers for the performance of their physical function is the best that could be devised. In studying a longi-

tudinal or vertical section *in situ* it will be seen that the majority of the fibers pass somewhat obliquely downward from the cementum to the alveolus. It will be noted that the greatest strength is so disposed that it may best resist strain from the occlusal surface and incisive edge, supporting the tooth so as best to prevent injury to the tissues of the apical space. In transverse section it will be seen that the fibers are distributed so as to prevent lateral displacement and rotation. The oblique course of the fibers is more pronounced at the angles, especially the labial, to prevent turning of a tooth in its socket.

In young subjects a large part of the alveolar septa is often wanting, and in that case the fibers pass directly across and unite with those of the neighboring tooth. With increasing age, as the bony development is more advanced, the fibers become surrounded and actually built into the bony structure of the septa.

The question of separation of teeth may here be considered. The lack of extensibility of the fibers is very important. For anatomic reasons, if for no other, when extensive separation is needed it would seem of great importance that the slow method be employed whenever possible, as the immediate method—metallic separators, wooden wedges driven to place, etc.—has been in the past and probably will be in the future the cause of the snapping of these fibers. This is followed usually by permanent separation of the teeth and the formation of pockets between them, due to the degeneration of the alveolo-dental membrane and destruction of the osseous septum. I have seen cases in which the greater part of the septum was destroyed within from six to nine months, and one extreme case in which three teeth, an upper cuspid and two bicuspid, were so loosened as a result of the destruction of their alveolar and membranous support that they were simply swinging. The case on ocular examination resembled in every respect the condition of advanced pyorrhea, differing possibly in that much more pus was present. This occurred within fifteen months after separation. The patient was a robust woman, probably about thirty, who had always enjoyed good health. There was no indication of syphilitic taint, and in fact by a process of careful exclusion it was decided that the excessive immediate separation of the teeth for the placing of approximal gold fillings was the direct cause. The teeth were of necessity extracted.

In orthodontia it is found that the movement of a tooth is difficult or easy in proportion to the strength of the fibers which resist its movement. The most difficult is that of depressing a tooth in its socket, while the easiest is the elevating of a tooth, in so far as the disposition of the fibers is concerned. The great length of time necessary for the wearing of retaining appliances in cases of rotated teeth is also explained mostly in this way.

Vascular and Nervous Supply.—The alveolo-dental membrane is abundantly supplied with vessels and nerves. These are derived from three sources—(a) the *gingival plexus*, (b) the *alveolus*, and (c) the *apical space*. These form rich capillary networks and nerve plexuses throughout the tissue. The supply from any one source is sufficient to maintain the vitality and sensory function of the structure. The vessels and nerves from the gingival plexus and those from the apical space may be cut off simultaneously and the tissue not suffer from lack of nourishment and sensation. Its rich supply of blood-vessels, lymphatics and nerves renders it capable of ready recovery from injury. This, however, does not mean that the tissue will readily reconstruct itself when once destroyed. It is questioned whether this tissue ever rebuilds itself when once any considerable area has become devitalized.

Considering its anatomic and histologic make-up and relations, it would seem that the condition of surrounding parts must be of utmost importance. If there has been a considerable destruction of this membrane, and the condition continued sufficiently long, as in advanced pyorrhea and alveolar abscess conditions, also in implantation, transplantation, and probably replantation, so that the death of the corpuscles of the outer part of the cementum has taken place, it would seem that one could not expect a return to the original normal condition. The irritating influence may be removed, the surrounding parts restored to as nearly a normal condition as possible, the alveolo-dental membrane freshened surgically and chemically, and treated with mild stimulating disinfectant and anti-septic agents, and brought to fill the space so that a fine exploring instrument cannot be passed into the former pocket to any extent, but to expect an entrance of the fibers into the cemental tissue and complete restoration of original conditions would be expecting something for which there seems to be no provision in nature's kind and wonderful repair shop.—*Cosmos*.

ESTIMATE OF PORCELAIN AS A FILLING MATERIAL.

By C. N. Thompson, D.D.S., Chicago. Read before the Chicago Dental Society, April, 1904. The tendency of the age is specialization; even dentistry has been justly divided into operative and prosthetic, and recently these have been subdivided into specialties. The oral surgeon and orthodontist are almost necessary departures, but not so with him whose specialty may be crown and bridge work, either porcelain or gold, or who may specialize along the line of some certain material or method for filling teeth, for if his specialty is anything more than name only he is not doing his patrons the greatest good, because, having specialized along one line, it is apt to become second nature for him to attempt to apply it to all cases, overlooking other possibilities. It is the wise use of all the proven good materials at one's disposal which makes a man more serviceable to his patrons than he is if he depends upon one or two. Fads come and go, leaving behind that which proves valuable. Amalgams and cements have had their day and have found their level; porcelain has passed the zenith of general attention, and has settled into its place as one of our best filling materials for certain cases.

Estimates are usually made by comparisons and are really but a forecast based on experience or statistics. The definition of the word, "A valuing or rating by the mind without actually measuring," foretells that we are not expected to have any conclusive facts upon which to base calculations in attempting to place a value upon the material under consideration; if we had an estimate would be uncalled for. Our experience with porcelain on a past record of about ten years has taught us much in its manipulation, but not enough to warrant its general use as a permanent filling, because any filling that is to be (so-called) permanent should last at least long enough to be worthy of the name. Statistics in the form of carefully recorded ledgers with accurately marked diagrams prove of little value, because subsequent examinations are uncertain and infrequent, and when it is remembered that we have not had porcelain of real merit until very recently, it will be seen that the best we can do is to base our calculations upon the present condition of fillings that are still doing service after a more or less extended exposure to the conditions found in actual use in the mouth.

In consulting records and notes it became noticeable in the history of these fillings that margins on occluding surfaces were failing

because they lacked edge strength, but that fillings on axial surfaces were holding their own. This naturally led to a decrease in the former and an increase in the latter, until now there is but little recorded relative to occluding fillings except as seen on incisal edges of the anterior teeth. But all thorough examinations with the magnifying glass of any strictly occluding filling of porcelain that had been in use long enough to wear out the cement at the margins showed without an exception chipped margins in proportion to the time that the filling had been exposed to masticating or occluding wear.

From this standpoint it would seem that much which has been recommended recently relative to its use in all cases is illogical, and that its field does not extend into occluding cavities, except in the anterior teeth, where its natural appearance overshadows its frailties. Its general use has been so strenuously advocated recently that in the light of the foregoing it would seem an oversight to pass the subject without calling attention to the unsound logic voiced. We are informed by some that porcelain should be used in all cases, and that those who do not so use it refrain only because they lack the skill. Never was there a more grievous mistake in either case, for porcelain itself is not durable enough for all conditions, even in the anterior teeth, and many operators who are skilled to the last degree in its manipulation deny its use in posterior occluding cavities.

It is said—and it may be true—that porcelain extremists are men whose gold fillings are not proving successful, and that they in following the usual course of cause and effect unwittingly assume that what proves best for them must be good for all, forgetting that the mote which is all their own prevents them from correctly interpreting the signs of the times as written by the marginal failings of porcelain fillings at their own hands.

It might be well to let unsound sayings pass, knowing well that whatever we write in our books to-day comes before the stern tribunal of time, which will review and stamp justly, but there are many just starting in this line who, taking their cue from the extremists' standpoint, try the to them impossible and fail—not because they were naturally lacking either mechanically or in the artistic, but because their instruction was unsound.

Enthusiasm in almost any line is necessary for success. To be

enthusiastic in the beginning insures success finally, and is what keeps us from falling by the wayside, but there are as many degrees of enthusiasm as of other things, varying from passiveness to extremes. The enthusiastic porcelain worker is one who thoroughly appreciates its virtues and is alive to its frailties, using it wherever edge strength is not an important factor. The extremist honestly considers it applicable in all cases, to the exclusion of other materials, and is like unto him who rode his employer's valuable horse to death to show its endurance—valuable only as an extreme example.

To beginners it might be said that there is reason to believe all ordinarily skillful dentists could as easily acquire the skill to acceptably manipulate porcelain as gold, and that the reason why so many fail is because they make no determined, well-planned effort to inform themselves. The same amount of time and pains applied to it as was spent in learning to manipulate gold foil would, on account of previous training, be more than ample for an actual beginning in the mouth, provided too much was not attempted at the outset. This is provided all have perfect vision, and in this connection it might be mentioned that statistics secured by railway companies, relative to the eyesight of those applying for positions, show that about 5 per cent of the eyes examined are color deficient or color blind. Such defect in the eyes of a dentist would preclude all possibility of succeeding, and should incapacitate him for many other departments of dentistry.

The dental profession have accepted porcelain as one of the desirable filling materials, but because we have accepted it we have by no means swallowed it whole as a panacea for all ills dental. It is not now a question of fitting and matching this material to the cavity and the tooth. Many can do either or both with success. The vital point is that the inherent weakness of the material itself is so far below gold in one particular—that of edge strength—that it ought never to be exposed to severe occluding strains, unless all concerned are satisfied with its lack of permanency and gradually increasing doubtful condition. In comparing it with large gold foil fillings it is now safe to say that the only point of superiority in favor of the latter is in edge strength, for in every other way porcelain is better, and in some ways vastly so. But the matter of edge strength is of such great importance that at times it alone amounts

to enough to warrant the use of gold in the anterior teeth to the exclusion of porcelain, and in the posterior teeth beyond the lines of vision in occluding cavities porcelain is never indicated.

The points of superiority of porcelain over gold seem to be at least four, namely, natural appearance, resistance to thermal action, glaze and ease of insertion. Regarding appearance, of course there is no comparison. All justly concede that porcelain is vastly superior, and this is its most recommendable feature, and it should, with all its frailties, be used in the six anterior teeth, except where the tooth in question is very thin, with a wearing underbite, or where the occlusion is direct and heavy. This does not alter the fact that nearly all cavities can be filled with porcelain, provided the patient fully understands the risk and the operator wishes to accept the chances. Resistance to thermal changes is also in favor of porcelain, proving slightly better even than gold inlays, and infinitely better than gold-foil fillings, even though underlaid with cement. Glaze or polish is also vastly in favor of the material in question. It is now considered one of the greatest factors in preventing recurrent caries near the margins of these fillings. Gold at even its highest finish does not begin to compare with it. Ease of insertion, compared with large gold-foil fillings, is also vastly in favor of porcelain, but in comparison with gold inlays it has no advantage. Gold-foil fillings in lingual pit cavities in incisors, and in pit and fissure cavities in bicuspid and molars, have the advantage of being more quickly inserted, and in the latter instance more durable. Small porcelain fillings usually consume much time and are difficult to manipulate accurately. When our porcelain compares favorably with gold, as regards edge strength, we may justly begin to use it promiscuously in large cavities. Until then, we will have use for our pluggers.

These fillings seldom break or crush. The weakness of all our porcelain to-day is lack of edge strength—a tendency to chip or crack away at the margins when exposed to stress. This, of course, is present at the incisal margins of all proximo-incisal fillings, but can be overlooked when its other virtues are understood. All chipping of margins is due in part to the indifferent way in which the cement supports it at that point, and would not occur so disastrously if the cement were stable.

Repeated examinations of well-fitted fillings in proximo-oc-

clusal cavities showed a rapid diminution of the cement on the occlusal surfaces as far as reached by masticating wear. Beyond that point the disintegration was slow and ceased entirely when about a line below the axial surface. The magnifying glass showed at first only increasing absence of cement at the margins on the occluding surface; later the margins of both filling and tooth enamel began to chip away, thus opening new access to the cement, the absence of which created new opportunities for chipping, which is logically a progressive weakness and means that porcelain is not indicated in such a cavity. A gold inlay in the same cavity would, judging from similar cases so treated, have been practically unchanged. There is no doubt but that cement is the correct method of filling teeth and is our hope for the future, but its present efficiency is so slow that by itself it amounts almost to a farce. However, to fill teeth with any desirable, accurately fitted material cemented to the cavity is beyond a doubt good practice, the mission of the cement being fourfold—retaining, supporting, sealing and non-conducting; and when used as in gold inlays, where it is possible to burnish the filling margins while the cement is yet plastic, it is possible to close the margin, sealing the cement in.

Next to a porcelain with a sufficient edge strength, our greatest need is a more durable cement, and it seems now the most insurmountable obstacle. It may be, however, that when the cement does appear porcelain will no longer be needed. Aside from the tendency to vacate the space between the cavity and filling, the opacity of the cement proves a great hindrance to concealing the union between the two. Fillings that appear an exact match previous to being cemented to place are sometimes destroyed by its effect in this way.

Cavity preparation in the anterior teeth for porcelain, compared with that for gold, is at a disadvantage, because the incisal enamel margins must be left sharp, which is not mechanically sound practice, even though the inlay is absolutely fitted, because they will chip if exposed to stress, and if beveled margins are necessary in order to make them safe, then cavity margin preparation for porcelain is a weakness in itself not present when beveled, as for gold, in any form. Aside from this, cavity preparation for porcelain seems somewhat less destructive of tooth substance, because, while there are just as definite lines to follow, the adhesive setting modifies

the need for deep or extensive undercuts in the dentin for retention. Anterior teeth with frail labial enamel can, owing to the supporting setting of the filling, be prepared without cutting extensively unless desirable. For the same reason frail incisal corners, resulting from extensive proximal cavities, can and should be retained far beyond that point thought safe for gold.

Extensive cavity formation for any material in the six anterior teeth is continually menaced by the tendency of the tooth to chip along the developmental lines of confluence, which are marked by line-like depressions labio-lingually across the cutting edge between the three little tubercles found on recently erupted incisors. These lines divide the incisal two-thirds of the tooth crown into three lobes. Calcification begins in these lobes separately and the grooves or lines are the marks of the after-confluence of these lobes. Just why teeth split along these lines is a question, but that they do is beyond doubt a fact, and one that accounts for many failures. However, it is of little import when preparing for adhesive fillings, except when the incisal cavity outline approaches it closely, when the cavity must be extended to or just beyond it, for if left thin it sometimes breaks away, leaving a decided notch between the filling and the balance of the tooth.

Porcelain does not last well in cavities resulting from chemical erosion, unless they are extended well beyond the limits of chemical action, which, owing to the hypersensitiveness of the dentin, is seldom accomplished, the significance of which is that porcelain is not often indicated in such location.

Cavity preparation for this material in the posterior teeth is another problem, because if the margins are not to be exposed on occluding surfaces the entire coronal surface should be removed and the margins carried out into the axial surfaces far enough down to make room for porcelain thick enough to stand. This formation can be modified in molars somewhat in favorable cases by secreting the margins near the fissures where they are to be protected by surrounding cusps and prominences. In bicuspid the margins that naturally fall near cusp points are unsafe, but less so if the entire cusp point is replaced by porcelain of considerable depth, thus placing the margin on the descending slope, which gives the filling at that point a strong marginal corner. Proximo-occlusal cavities in bicuspid and molars, owing to the fact that the filling must be in-

serted from the top and in one piece, demand considerable broadening at that point, not necessary in preparation for gold.

Matters of cavity preparation for this material are by some considered unimportant, but a careful, unbiased study of the subject will show that as a mechanical problem it is good practice as a guide to prove the filling accurately seated when cementing to place. Retention grooves are also decried, but when it is remembered that the greater cement surface there is in proportion to the size of the filling the better, it will be seen that their adoption will increase the cement area and retention, and this is not taking into consideration the possibilities of interlocking the grooves and prominences.

The object in calling attention to the porcelain bodies on the market is to bring out their shortcomings, and if possible select that which is necessary to produce the best filling. The successful construction of porcelain inlays depends materially upon the physical properties of the material at hand, such as density, edge strength, fusing-point, translucency and shrinkage. There is none on the market that excels in all these. All are being used, however, and perhaps all have merit, but none is equal to what they could be if the manufacturers, with perhaps two exceptions, would note our needs.

True fusion means the point at which porcelain attains its greatest density or strength. The outfits that arrive at this point before they glaze should have a low-fusing enamel color to fuse over them as a glaze. Those bodies that come to full glaze before they come to greatest density are entirely unfit for inlay work at all by themselves, because they lose form in fusing, and being fused clear through shrink to a common center, distorting still further. Either of the above will not produce true to life.

The true method of making these restorations has often been described, but may stand repeating. The plan referred to is to use a rather high-fusing body that does not glaze well at greatest strength to give form and outline, and is not to be refused at subsequent bakings. On to and over this fuse lower-fusing bodies in layers for shade, thus going one step further without losing form or distorting matrix. Over this fuse still lower-fusing enamel colored body for the translucent glaze. There are two outfits on the market based on this plan. All of the others manufactured are of

one fusing point throughout, and are therefore a stumbling block to progress for all concerned, and unless a dentist in this work can be satisfied with the outfits that embody the plan mentioned, he is compelled to use a portion of two or more outfits to arrive at the same conclusion. For instance, for the form or foundation bodies use Close high-fusing yellow and white; for the colors use any of the high-fusing inlay outfits, i. e., White's, Consolidated, or Brewster's enamel colors, and for the glaze use any lower-fusing body that is like tooth enamel, as Brewster's XX. This will produce fillings that are true to form, shade and fit.

Matching Shades.—Owing to the physical difference between our porcelains and the human teeth, the possibility of absolutely reproducing lost parts is remote. No man, be he ever so expert, even with the exercise of the most scrupulous care, can exactly and certainly duplicate any lost part. The result may be good, but all that he can be sure of is a close approximation in shade, and this is best secured in beginning by reproducing the several parts of the reproduction in their order, starting at the base or dentin first, over which place thin layers of pronounced enamel shades, and last, a normal thickness of true enamel colored body.

The limitation of porcelain, therefore, is not governed by the ability of the operator entirely, but rather by the resistive properties of the material itself, combined with the uncertainties of the cements, which give it a distinct field. In all large cavities not exposed to occluding stress, considering all its virtues, it is superior to gold. In occluding cavities in the anterior teeth its natural appearance is of such great importance that it alone is sufficient to warrant its use in nearly all cases. In proximo-occlusal cavities in bicuspid and molars within the lines of vision it may be used in favorable cases, provided all concerned understand its frailties. In all large occluding cavities beyond the lines of vision gold with its great edge strength, in the form of inlays, is logically correct, to the entire exclusion of porcelain, and in connection with this it should be stated that proximo-occlusal cavities within the lines of vision, that have exceedingly frail buccal enamel, can be successfully filled with gold inlays by first reinforcing with cement and allowing the filling to protect the edges. In this way it is possible to securely fill many badly decayed posterior teeth with gold inlays,

without allowing the metal to appear on the buccal surfaces to the extent that would be thought necessary for gold-foil fillings.
—*Review.*

THERAPEUTIC VALUE OF THE X-RAYS IN DENTISTRY AND ORAL SURGERY. By Dr. M. I. Schamberg, Philadelphia. Read before the New York Odontological Society, March 15, 1904. There are probably no remedial agents the properties, uses and limitations of which become definitely known until after years of scientific research and clinical experimentation. The X-ray proves to be no exception, for while much progress has been made in the field of X-ray therapy during the short period since the discovery of its curative influence, there is much still to be learned relative to the dosage, technique and possibilities of this wonderful agent in the treatment of diseased tissues.

At first the X-ray was heralded as a cure for cancer. Later it was tried upon lupus and was found to rival Finsen's light in its effect upon that disease, and now it is being experimented with for the relief of many affections of benign as well as of malignant nature. In fact, there is no branch of medical science which is receiving more attention than that which pertains to radio-therapy. Specialists in almost all departments of medicine are eagerly testing the value of this agent in the management of obstinate conditions which come under their care. It is a singular fact that many diseases which have been more or less non-responsive to other forms of treatment have yielded to the remedial influence of the X-ray. It is therefore not surprising that radio-therapy has taken such a strong hold on medical and lay minds and that its indiscriminate employment has resulted in many failures.

That the X-ray is a valuable therapeutic agent is a certainty. That it has its limitations is equally true. It would be indeed surprising if it had proved to be a panacea for all ailments. Conservative observers recognize in the X-ray a remedy capable of great good in appropriate cases, but having distinct limitations. With the X-ray enthusiast who claims cures of innumerable diseases on one hand, and the surgeon who gives but little credence to the value of the rays in the so-called surgical diseases as his opponent, it requires the keenest judgment upon the part of the general practitioner to arrive at the truth.

During the past year the writer has had an opportunity to observe the remarkable influence exerted by the rays upon certain diseases of the skin. The encouraging results achieved by dermatologists in the treatment of lupus, superficial epithelioma, acne and other dermatoses prompts the belief that many similar affections of the mucous lining of the mouth, if properly reached by the X-ray, might likewise respond to its influence. From time to time reports have appeared in medical literature indicating that the X-rays may be successfully employed in the treatment of certain pathological conditions in and about the mouth. For a year or more I have been using the rays in a variety of conditions connected with the mouth and face. In some of these cases the opportunity was not given for an exhaustive trial of the remedy, and absolute conclusions cannot therefore be drawn from these observations. The character of the conditions treated and the results obtained are briefly appended:

A man sixty-two years of age presented for treatment with an extensive epithelial cancer involving the buccal and alveola mucous membrane of the left side of the mouth. The patient, refusing operation, was subjected to X-ray treatment. Twenty-eight applications, averaging ten minutes in duration, were applied during a period of two months. The rays were applied through the cheek and directly to the mucous membrane through a lead funnel. Despite this treatment the growth increased in size, causing a considerable tumefaction of the subcutaneous tissues. The man subsequently passed from my observation and became an inmate of the National Military Home, where he later succumbed to the disease.

It is a well-known fact that cancers of the buccal mucous membrane are dangerous growths, difficult to cure by any means, operative or otherwise. Those who are in the best position to judge are of the opinion that cancers in this region would better receive prompt surgical treatment than be subjected to the X-rays. Moreover, it is a difficult matter to exert a favorable influence upon such a condition in the mouth without producing extensive structural changes in the overlying skin penetrated by the rays. In fact, in all forms of deep-seated cancer the rays are inferior to surgical interference, and should be employed only in inoperable cases or as a palliative for the relief of pain. Most superficial epitheliomas

are curable, and for cosmetic reasons such growths upon the face are best treated by the X-ray. -

A physician aged twenty-seven came under my care for X-ray treatment for an epithelioma on the side of the face. The growth was of three years' standing, having recurred after removal by cureting and cauterization. Sixteen applications, averaging six minutes in duration and extending over thirty-nine days, resulted in the complete disappearance of the lesion. Three months have elapsed since the treatment and there is no sign of recurrence.

Leucoplakia, a frequent forerunner of buccal carcinoma, is a condition commonly seen in the mouths of heavy tobacco users. It would seem reasonable that a surface affection of this kind might favorably respond to X-ray treatment, providing the case were seen early and treatment vigorously applied. In a severe and long-standing case the course of which I had the opportunity to follow, involving the greater part of the dorsum of the tongue, the disease was favorably influenced by X-ray treatment, but subsequently relapsed. In this instance the condition might have yielded to continued vigorous treatment, but it was not felt to be warranted to expose the patient to the danger of a severe burn.

Tubercular glands, so frequently found in the region of the neck, are reported in a number of instances to have disappeared under application of the X-rays. In enlarged glands of non-tuberculous origin similar good results have been obtained. The prompt disappearance of an enlarged gland in the following case indicates the advisability of trying this method in any glandular tumefaction before resorting to the knife. A young woman twenty-four years of age was referred to me by her physician for X-ray treatment for an enlarged gland of the neck immediately beneath the ear. The gland followed the line of the anterior border of the sternocleido-mastoid muscle, was one and a half by two and a quarter inches in measurement, and was tender to the touch. It had not been influenced by previous internal medication or topical applications. Other causes being excluded, the family physician ascribed the appearance of the growth to oral or pharyngeal infection. Eight ten-minute treatments during a period of twenty days caused the gradual subsidence of the enlargement, and though eight months have elapsed since its disappearance there has been no return.

The X-rays have been noted by many observers to have decided

analgesic properties. It has often been noticed that pain has been completely relieved in cancers and other growths subjected to the rays. This valuable property of the X-ray has suggested its use in the treatment of obstinate neuralgias and allied conditions. A number of references will be found in the literature concerning the successful application of the Roentgen rays for this purpose. Dr. Charles Lester Leonard, a well-known Philadelphia X-ray specialist, says in this regard: "Some of my most interesting and valuable work has been in this direction—curing neuralgia. One patient I have lately had is the brother of a prominent physician of Philadelphia, who had neuralgia of the nerves of the face for twelve years. The pain extended along the superior and inferior dental nerves on both sides. His teeth were loose in their sockets, and he had been rinsing his mouth with Jamaica ginger with a little glycerin as a remedy. That case showed almost miraculous improvement under the X-ray. Three exposures of five minutes each to either side resulted in completely relieving the pain. After two weeks' treatment his teeth resumed their natural position in their sockets. Another case, which was under the rest treatment for two weeks last year without improvement, was that of a lady who was suffering from neuralgic headaches affecting the frontal nerves on both sides, in conjunction with sick headache. After treatment with the X-ray the neuralgic symptoms entirely disappeared. She stated that her head felt 'as if it wanted to ache,' but there was no pain. Another case of neuralgia of the supraorbital and infraorbital region was cured by five applications of three minutes each in two days' time. Here we see apparent cures, and a way open for the cure of most forms of neuralgia."

The only case of neuralgia in which I have employed the X-ray was in the person of a trained nurse who had been suffering for a year or more from an intermittent pain over the left side of the face. The pain was particularly referred by the patient to a depression on the gum where the process had been removed during the extraction of a tooth. Incision of the scar was followed by relief—which, however, was of short duration. The face was then vigorously exposed to the X-rays for five minutes. This was followed by cessation of the pain. A letter received from the patient three weeks later informed me that there had been no recurrence. Some reservation must be made in this case as to the actual curative

influence of the rays, owing to the brevity of the treatment and the fact that the patient was a neurasthenic. However, the patient felt highly pleased with the results and attributed the cure to the X-ray treatment.

It is important that all cases of trifacial neuralgia should be carefully studied from an etiological standpoint, for the cause can often be found in an offending tooth or some equally benign condition amenable to ordinary treatment. Where, however, such causes are excluded and the case is one of persistent neuralgia, the X-rays should be employed before radical surgery is resorted to.

Pyorrhea alveolaris, being a pathological condition which frequently responds but slightly to well-directed treatment, is one of the diseases which we as dentists are most anxious to favorably influence through the medium of the X-ray. For that reason it is not surprising that a number of men are now experimenting with the treatment of this disease by radio-therapy. Personally, my work in this direction has been so limited that I am not prepared to offer any conclusions. In the few cases that have come under my care but one or two X-ray treatments were applied, and I am not satisfied that the improvement which followed was as much due to the X-ray treatment as to other local and constitutional measures instituted in these cases. [Since this article was written there has appeared an article by Dr. Weston A. Price on "The Treatment of Pyorrhea Alveolaris with the X-Rays." His experiments are conclusive, and prove the X-rays to be of unquestionable value in the treatment of this obstinate disease.]

It is quite possible that the X-rays will find a field of usefulness in dental conditions other than as herein mentioned. It is quite reasonable to believe that the rays may be advantageously employed in incipient and chronic abscesses, in fistulas with indolent granulations, in the reduction of hypertrophied scars, in chronic antral diseases and allied conditions. Time and further experimentation alone will shed the necessary light in this direction. It is important for workers in this department of medicine to cultivate a conservative spirit, and to maintain a fair, judicial attitude in order that a proper estimate of the value of the X-ray be arrived at. To this end it is desirable that negative and unsuccessful results should be reported as well as favorable ones.

DISCUSSION.—*Dr. Sinclair Tousey:* In my own work I make

a more varied use of what we might call photo-therapy. I find the X ray alone will not accomplish as good results as the X ray combined with the ultra-violet ray—either from the Finsen lamp or a modification of it. In treatment for pyorrhea I use the X ray and also apply these vacuum tubes, with a bulbous extremity connected with one pole of a very powerful coil such as is used for producing an X ray. The patient has hold of a metallic connection coming from the other pole. When the current is turned on, the region being of course sensitive, we would not use as high voltage as for a case of paralysis. For these cases it is applied to the outside of the face, and produces the effect of this light, and also an effect from the ozone upon the surface, and is also carried into the tissues by the current. The ozone we become accustomed to, but a new patient notices it at once. I had occasion to treat a physician some little time ago, and he said he smelled the ozone the morning following the exposure.

We have a current of very high voltage and considerable amperage. It differs from the static machine altogether, in the fact that we have an amperage of 125 milliamperes attached to this tube, which is applied locally. We obtain many times the amperage of the static machine, as with the latter even those tremendous sparks have only one two-hundredth of a milliampere.

As to whether the superficial cancerous effects are more easily reached than the deeper ones is a question that has puzzled me exceedingly. Two of the cases which I succeeded in simply holding in check for a couple of years have been like the case of epithelioma which the essayist showed. One involves the bones and the cavities of the nose, showing principally on the outside, and the other simply the soft tissues of the lower eyelid. Do what I would I have not been able to cure them. On the other hand, there is the case of a woman fifty years old, in which I have been able to cure apparently a very deep-seated affection—a very large fibroid of the uterus, which she had had for a number of years. A year ago last month she went to the Presbyterian Hospital for operation. Under ether it was found that the whole pelvis was one solid mass of cancer, and there was simply no removing it at all. They took away a piece of the cervix to verify the diagnosis of carcinoma and let her go home, expecting her to die in about six weeks. She was brought to my office. At first she came in a

carriage, with a nurse, a physician, her mother and her husband. She had a frightful discharge with a very bad odor. She was very miserable, and was often not able to keep her appointment. If she had one for Tuesday she would possibly arrive Saturday. I made application of these high-frequency currents—the vacuum electrodes I speak of with the 10,000 waves of ultra-violet light—over the regions of extreme pain, which I thought was due to the stretching of the broad ligaments. The pain was the first thing to stop, then the discharge and the odor, and then she began to take in her clothes at the rate of two inches every week, indicating the disappearance of the fibroid. She began to be stronger and would keep her engagements more regularly; gradually she dispensed with the assistance of her nurse, her physician, her mother, and then her husband. The last few weeks she came to me she was traveling on a street car, as fine a looking dowager you would want to see, with a box of candy or some fruit to take to some sick friend. I turned her over to her physician on the 6th of August, and she is still well and happy—no return of the carcinoma, and the fibroid is only half the size it was when we began. You see you can hardly determine beforehand which are the cases in which you will succeed and those which will prove failures. I have seen a case of sarcoma of the jaw with a long, slow history—it must have been an osteosarcoma—which eventually got well under the X-ray treatment. As the essayist says, the cancerous growths of the bone are generally difficult cases.

In my own work I have practically abandoned the use of sheet-lead screens and protections for the patient, and use X-ray tubes (which the essayist alluded to) of special construction, throwing the light only in one direction. One of my own tubes throws the light almost the same as if we were directing the light of a dark lantern.

The X ray itself certainly stops pain—as in cancer of the stomach, for instance.

I can corroborate the doctor's observations on the neuralgia question. Sometimes the static machine, in cases of neuralgia of the face, works better, and is not open to the objections of the X ray.

As for cases of Bell's paralysis, these vacuum electrodes—high-frequency currents—would be suitable. My experience with that began on two cases of infantile paralysis. I call the treatment I was

giving them "X-ray treatment," because I group the whole thing. All the work I do I call "X-ray work," whether it is static machine, or high-frequency currents, or the Finsen light. One little child had the typical infantile paralysis. One poor little arm was all crippled up and stiff, and the leg the same way. In the course of a few months that side was as strong as the other, and the child became fat and jolly.

During the past two years a great deal has been done with the X-ray and kindred applications as adjuncts to the mechanical and chemical treatment of pyorrhea alveolaris, and during this time many reports upon the subject of pyorrhea have been published. From these we gather that the probability is that the ordinary pus organisms, such as the staphylococcus, Bac. pyocyaneus, Bac. coli communis, etc., have no direct share in the production of pyorrhea alveolaris, and that the pneumococcus is also absent; probably a member of the yeast family is the pathogenic germ. The constitutional conditions are often due to poisoning by toxins, and a filtered broth culture from these teeth kills guinea-pigs. The constitutional cause is frequently rheumatism or gout. (Newell.) This observation I can abundantly corroborate. Much of my own practice in electro-therapeutics consists in the constitutional treatment of uric acid diatheses and diabetes, and among these patients there is a marvelous percentage of Riggs' disease. The teeth themselves are generally free from caries, and the dental tissues are highly organized. Some cases arise from—(1) A primary gingivitis, with the formation of hard scaly dark calculi beneath the gum margin. (2) The gingivitis is not marked, early deposits may be absent, and there is phagedenic pericementitis. (3) In still other cases degeneration and necrosis of the pericementum occur and deposits of calculus come upon the lateral aspects of the tooth-root, the gum margin being normal. (Burchard.)

The clinical appearance is described by Guy in the *Dental Record*, reviewed in the *DENTAL DIGEST* for September, 1903. In his patient there was chronic enlargement of the submaxillary glands; the lower incisors, cuspids and premolars were all very loose; the gum festoons hung patulous away from them; the gums were unhealthy, spongy, livid, and almost purpuric; pus exuded freely from about the roots

of the teeth; the two upper incisors and a number of roots required extraction. The teeth were hypersensitive to thermal changes.

In one of my own patients there was such great pain all along the right half of the lower alveolar margin as to confine her to bed for several weeks, during which time the dentist had to visit her twice a day. She came to me six months later for constitutional treatment for indefinite digestive distress, with rheumatic or neuralgic pains, and with an excess of uric acid and a large amount of sugar in the urine. This is a condition which yields to the application of high-frequency currents and vibratory massage, and these were applied over the abdomen, the spine, and the affected joints. A few applications of the X ray by my special tube were made to the teeth. The result was apparently a perfect cure, but it could not have been accomplished without the local applications by the dentist.

Dr. Faneuil D. Weisse: I notice that no reference has been made to applications of the X ray directly into the buccal cavity; the only one was a case of a fibroma on the inside of the cheek, and had no bearing upon X-ray work whatever. In the other cases that were related the current was transmitted through the lip, and it was only in superficial or skin cancer, etc.

We are making experiments with the X ray for the treatment of pyorrhea by direct application to the gums, and also to conditions of alveolar abscess after extraction of the tooth, by direct application to the gum. The few cases that have been under treatment up to the present time have certainly been benefited. I would state that with a reservation, however, for nature has much to do with the improvement where these conditions occur. The cases of cancrum oris that were presented on the screen are certainly hopeless without the aid we can offer them. We know there is a bacillus known as the Lingard bacillus, that has been considered the cause of cancrum oris. Some authorities have confirmed this observation of Lingard, while others have not. It seems to me that these cases, from their steady progress and their continuous ravages of tissue, indicate there must be some bacterial influence to produce such destruction.

I have also in these cases thought it would be well to apply to them a strong escharotic. I call to mind the treatment with bromin that I used during the Civil War in cases of hospital gangrene. One of the experiences that came out of the war, as far as the surgeon was concerned, was the use of pure bromin in arresting those condi-

tions of phagedenic ulceration. The application of the bromin is painful, and in the army the patients were placed under an anesthetic for its use on large surfaces. In such cases I have no hesitancy in using the bromin, realizing its great germicidal effect.

Dr. M. L. Rhein: There is a great field in the treatment of pyorrhea for the apparatus that Dr. Tousey is using. I have seen sufficient benefits derived from the ordinary X-ray applications, both in these cases and in forms of chronic abscess, such as the essayist alluded to, to believe that we are at the outset of a radical change in our treatment of certain forms of indolent cell-activity in the mouth. Dr. Tousey assumes that he will find a pathogenic form of bacteria in it, but I think he will find that he is unable to isolate any pathogenic form; the form of bacteria is of a mixed type. The field is one that is very attractive at the present time, and I want to say that it is absolutely impossible—it is absurd almost—to expect the results that I have seen, unless we have had the proper preliminary surgical treatment of pyorrhoeal cases. Unless that be done, in the thorough way which we recognize as a necessity, the application of this radiotherapy is of very little value. There is a type of indolent cell-formation, such as we have frequently heard described as a fungous growth, where there is present the giant-cell formation of tissue as the main incubus against the reestablishment of healthy conditions. In this type of case we have reason to believe that we may hope for the real cure of this form of pathogenic condition.

Dr. Schamberg: In regard to the difference in results achieved by different operators upon individual cases, as to whether deep-seated or superficial cases respond most readily, that depends largely upon the technique employed. Some men use more vigorous applications, and some believe in stopping the treatment for a while. Then, again, idiosyncrasy plays a part; some patients respond more quickly, just as some respond to internal medication better than others.

In regard to Professor Weisse's remarks, I imagined you would be disappointed in that I touched so little upon the value of the X ray to the dental practitioner therapeutically. I do not believe it is of great value to you. I do not think the results in the treatment of pyorrhea have been sufficiently conclusive. The case Dr. Weisse mentioned, of phagedenic ulceration of the mouth, I believe to be somewhat different from cases of cancrum oris, inasmuch as it runs

some length of time. In cancrum oris I find a favorable or a fatal termination in about two weeks. Cases usually run a very rapid course.—*Cosmos*.

COMBINED RAY AND ITS APPLICATION TO DENTISTRY. By Arthur E. Peck, M. D., D. D. S., Minneapolis. On a recent trip to the Pacific coast, and while in Seattle, my attention was called to the investigations of Dr. C. E. Rogers in the application of light as a curative agent for disease. I was in that city some four or five days and had an opportunity of seeing a number of remarkable results under his guidance. He has been investigating and perfecting this treatment for the last four or five years, and his final deductions have resulted in the adoption of a three hundred candle-power incandescent light surrounded by a peculiar reflector which condenses the rays, not to a minute point as a parabolic shade would do, but the condensation is of a larger range and produces a new ray, called by him the Combined Ray. He applies this term because of using the other rays of the light spectrum in conjunction with it, believing them to be of assistance in the efficiency of this new ray. It has the property of penetrating bone with as much facility as soft tissue. Suppose a bullet to have lodged in one of the large bones of the body, the femur, for instance; a photograph with this light would show the bullet but not the bone, while with the X ray the bullet would be invisible, but the bone with the ragged entrance would be seen. It has great penetrating force and there seems to be scarcely any danger from its use, as the burn which is possible from the extreme heat is prevented by indications from the patient before it comes to that point. This is quite the opposite from the X ray and others, and it can therefore be used by the novice without danger. In its application to disease it has a large field, including many of the conditions met by the dentist, and in a large majority of these diseases the results are almost miraculous; and in all forms of inflammation and pus formation it seems to be especially applicable. My attention was attracted by this feature of the light, so I had one installed in my office, and the results produced by its use have given me the greatest satisfaction.

My first application was made in the case of a patient who had a severe headache. In about seven minutes I was able to relieve

the pain entirely, placing her in a grateful frame of mind and in a much better condition to stand the necessary pain accompanying a dental operation. I have as yet to find the headache which cannot be controlled by this light in from seven to ten minutes. My next application was in the case of a patient having acute neuralgia, indicating itself by the usual paroxysmal pain in the supra and infra-orbital branches of the fifth nerve. From seven to ten minutes' application of the light was all that was required to entirely relieve the pain. I then had occasion to apply the light to myself, having been afflicted for years with acute attacks of neuralgia, occurring possibly three or four times a year, always in the supra and infra-orbital branches, and usually so severe that I am compelled to drop my work, sometimes in the middle of an operation. From ten to fifteen minutes' application of the light relieved me entirely and I have not had a return since.

I am using it in the treatment of pyorrhea after having thoroughly cleansed the roots, and hope to see beneficial results. The time since the treatments has not been sufficient to allow me to speak definitely, but the indications are very favorable.

While the cases above mentioned should receive our attention and can be controlled with the light, the most important field lies in the almost miraculous relief given to patients suffering from a suppurating tooth. I believe that from one to three applications, of ten to twenty minutes each, will give entire relief to practically every case of this class; the pus-forming germ is destroyed and the pain from pressure disappears almost immediately, allowing the operator to open and treat the tooth without further inconvenience to the patient. I have had cases come to a head in from two to three hours after the first application, and when opened there would be only a drop or two of pus. It has given immediate relief in every case of suppuration on which I have used it, and in a number of cases I am sure it has saved the patient from twenty-four to forty-eight hours' suffering. To better illustrate the usefulness of this light, I will cite the case of a patient who was brought to my office, having ten days previous had a lower third molar removed, the dentist using a local anesthetic. Shortly after the operation her face began to swell and the muscles stiffen, until she was unable to take nourishment except through a straw. A consultation of the dentist and a physician resulted in a decision that the condition was caused by her

having taken cold in the wound. The swelling had now involved the glands of the neck and was very sensitive to palpation. It was with difficulty that I could place my mouth-mirror in a horizontal position between her teeth. Twenty minutes' application of the light removed all of the pain; the swelling was scarcely sensitive to touch; she was able to open her mouth nearly three-quarters of an inch, and on her arrival home she took solid food for the first time in four days. Two applications of the light cured the case.—*Summary.*

RELATION OF DENTISTRY TO GENERAL MEDICINE.

By G. H. Owen, D.M.D., B.S.D., St. Louis. Read before the Fraternal Dental Society, June 21, 1904. This is the day of the specialist. The progress of the world in the fields of letters, mechanics, science and art has reached such magnitude that no one person can longer hope to become proficient in more than one of them.

Dentistry and general medicine are the subjects that specifically demand our attention to-night. Are these two professions separate and distinct, or are they branch and stock of one department of scientific achievement? A few months ago the Chicago Medical Society passed a resolution that dentistry is and should be regarded as a specialty of medicine, and in the main that resolution states the true relation. Dentistry is a special department of general medicine. It is not a specialty of medicine such as the work of the oculist, aurist, etc., is, but is a *separate department* of medicine. It is necessary that it should have its own degree, and also some special instruction in preparation that is not required for the regular degree of M.D. as it now stands, for no medical student is capable of practising dentistry. Consequently it is necessary to go further in this special department and devote some time to the special studies appertaining only to the care of the teeth. Hence this eliminates dentistry as a simple specialty of medicine, for in that case all graduates would be entitled only to the degree of M.D., and they all might practice dentistry, which upon the face of it is absurd. Dentistry is a separate department in the great field of medicine, but subject to its own laws and having its own degree. While this is true, the medical fraternity are somewhat slow to realize it and to accord to dentistry its true place, and to rely upon the assistance of the dentist in their practice. General medicine can never meet with those rich

results to which it is entitled without a complete cooperation with and reliance upon this essential department, and likewise the skill and assistance of the physician must second the efforts of the dentist many times ere the richest fruition is reaped by the patient, so I plead for a closer union between this great family whose mission is man's good. I can already see the dawn of this coming day, for medical schools are beginning to establish a chair upon the subject of the mouth, with a dentist in charge of it, and others will follow.

The necessity of the advice and assistance of the dentist to the physician has to be established by experience, and experience is a slow school but sure. Much progress has already been made in the last ten years. Considerably behind his profession is the physician who does not recognize that a mouth strong in acid, infested with microbes, and abounding with constant fermentation is persistently hammering away against the health of the delicate stomach and intestines. What kind of a physician is he who, making stomach troubles his specialty, does not recognize the potency of a clean mouth able to perform its normal mastication?

Again, the neurologist is equally dependent upon the dentist. The nerves of the teeth connect through ganglia with all the nerves of the head, and often pain is localized to the patient elsewhere than its real situation. Earache, eyeache, headache, and general neuralgia are often the direct results of inflammation in the pulps of teeth, and the physician without the aid of the dentist in nervous pains about the head is on a strange sea, without a compass or nautical chart. Likewise the dentist is the most competent one in the diseases of the antrum of Highmore, but especially is he needed to second the efforts of the physician.

Many cases have come under the care of each of us. Three especially come to mind at present because they eminently illustrate these points. First case. About two years ago a physician referred to me a lady, who gave a history of having had pains in the head for the past several months, but for the last three weeks they had been worse. She was attacked with insomnia due to nervousness induced by pains in the head when she lay down at night. The physician had been summoned several times in the night and had had to resort to morphin to ease pain and induce sleep. No improvement being noticed from the treatment, the case was referred to me for examination to ascertain if the cause was from the teeth. They

were in fairly good condition, not much work apparently being needed, but in looking over the mouth a lower right first molar gold crown (which I afterwards learned had been put on by an advertising parlor dentist) attracted attention, more from its occlusion with the upper teeth than otherwise. The occlusion occurred on an inclined plane, causing the tooth to be jarred from its natural position every time the mouth closed, and there was no locking of cusps. The crown had been worn about a year. It was removed; the root-canals were apparently well filled; a correctly-occluding crown was made and replaced. Not much improvement being noticed, the patient returned in a week. It was then suggested that the constant striking in an unnatural plane might have caused irritation in the pulp of the superior antagonizing molar, which was perfectly sound. Acting upon this theory the pulp was opened into and the main cause of the trouble discovered. The pulp was inflamed and full of pulp stones caused by the prolonged and constant irritation from an unnatural occlusion. No amount of skill of the physician alone could have brought relief to this patient, as the cause was obscure, and only his knowledge of the field of dentistry was instrumental in affording ease.

Second case. A young lady visited her physician for earache, the pain being worse at night and at intervals. He treated her for several days, and finally, in his efforts to afford relief from an excruciating pain, punctured the ear drum and opened into the middle ear. No trouble, to his surprise, being found there, he finally suggested that she visit her dentist. She presented and the whole trouble resulted from a diseased superior third molar on the side of the head on which the ear apparently was aching. Upon the correction of the trouble in the tooth the pain in the ear immediately ceased and did not recur.

The third case was that of a man about fifty years of age who developed a swelling below the angle of the lower maxilla on the right side. His physician treated him for some time, but the swelling soon developed a fistula with a persistent and annoying discharge. Finally the man changed physicians, but found no relief. He then changed to the opposite school of medical practitioners and finally drifted into the hands of a surgeon, who dissected out the submaxillary gland; still no relief. He then was referred to a dentist, who called me in to see the case. Upon examination we

immediately diagnosed an impacted third molar, which with considerable difficulty was removed. Had the first physician in the beginning referred the patient to the dentist it would have eliminated the long unsightly cicatrix across his face, the worry and depression of the operation would have been avoided, and his little farm would not have disappeared in his efforts to be cured.—*Brief.*

IODOFORM FOR THE PLUGGING OF BONE CAVITIES.

By Dr. Mosetig-Moorhof. (*Cincinnati Lancet-Clinic.*) The author reports (*Deuts. Zeits. für Chir.*) the results of 220 pluggings (in 195 patients) of bone-cavities with an iodoform mass—a mixture of 60 parts finely powdered iodoform and 40 parts spermaceti and sesame oil. This gives a yellow mass which is stiff at room temperature and melts at 50° C. The iodoform will settle to the bottom unless the mass be constantly shaken during the heating. A fluid mass which will reach every irregularity, side cavity, or crevice of the bone cavity is considered to be essential to the result. Another important factor is a perfectly dry bony wall.

The bone is widely and freely exposed by a curved incision which will give a definite flap. This flap includes the periosteum, and is shaped without reference to the location of sinuses. The bone is opened with a chisel or electric saw, and the necrotic focus is thoroughly scraped out with a sharp spoon. The scraping should be continued until all diseased tissue has been removed, and then the cavity should be wiped perfectly dry and its interior swabbed with a 1 per cent solution of formaldehyd. The cavity should now be dried by a stream of hot or cold aseptic air. The preparation of such a cavity will sometimes take thirty minutes. The iodoform mass is now introduced, with due regard to a complete filling of every corner of the cavity. Rubber tissue is then temporarily placed over the hardened mass, fistulæ are thoroughly curetted, the tourniquet is removed, the bleeding in the soft parts arrested, the wound sutured, and a dressing applied which remains in place for ten days or two weeks.

There is no danger of iodoform poisoning, because of the very slow absorption. The wound usually heals by first intention, and the patient is able to resume work in six weeks. The subsequent healing of the bone-cavity can be very accurately followed by means of the X-ray. Iodoform casts a much denser shadow than bone,

and the gradual absorption of the iodoform, with a corresponding growth of bone from the interior of the wall, can be followed to the stage of complete absorption of the iodoform mass and complete regeneration and closure of the cavity with osseous tissue. A failure to retain the mass or its subsequent removal by operation did not occur in the 220 applications. The method is of course not applicable in acute osteomyelitis, but in chronic circumscribed cases of the chronic type. It has been applied with equal success to tubercular disease of the bones and joints, and has also been employed in packing four cases of dental cysts and two cases of empyema of the antrum of Highmore with excellent results. The procedure here suggested may be used to advantage to fill up the space produced by the amputation of necrosed root tissue in the surgical treatment of chronic periapical abscess.

OPENING CAVITIES TO GAIN FREE ACCESS TO ROOT-CANALS.—In opening cavities for the treatment of pulps we should not hesitate to freely remove sufficient of the tooth substance to permit free access to the interior of the cavity, cutting mostly to the cornua of the pulp. This should be the vital point of exposure. In opening the pulp an instrument with a rather broad cutting surface should be employed, and then cut in a longitudinal direction with the surface to be exposed. By so doing, proceeding with care, the broad surface will pass gently over the pulp, without being forcibly pressed into the same, and as the reflection of the pulp can be readily seen through the thin lamina of bone intervening, the sharp angle can then be easily made to raise this thin section without inconvenience to our patients and with much satisfaction to ourselves. Instruments with rounded cutting surfaces, in my estimation, cannot be advantageously used.—J. F. WERNER, *Summary*.

HOME MANUFACTURE OF FORMALDEHYD GAS FOR INSTRUMENT STERILIZATION.—Formaldehyd is produced by the oxidation of methyl alcohol. Lamps for burning the wood alcohol depend upon platinized asbestos as the agent which when incandescent produces the oxidizing process, breaking up the wood alcohol into formic aldehyd. This asbestos has not proved lasting in the lamps which I have used, being liable to fail just when most needed. A small piece of sponge platinum held above the wick of any ordinary alcohol lamp by some simple contrivance works admirably, placing the lamp in any suitable enclosure, as an oven of tin or copper or a chafing dish, cutting a hole in the bottom large enough for the burner to extend inside. Light the wick and heat the platinum to incandescence, then extinguish the flame and the metal will retain a dull glow and produce formaldehyd as long as there is alcohol in the lamp, the amount depending on the area of platinum and the size of the wick.—H. L. Wheeler, *International*.

The Dental Digest.

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At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

IDENTIFICATION BY MEANS OF THE TEETH.

Our readers will remember that we touched briefly on this subject some months ago, when the only means of identification of some of the Iroquois Theater fire victims was through the knowledge which dentists had of their teeth. A recent newspaper article again brings the matter to mind. About six months ago a young woman was buried in New York under an assumed name. A family in the city became convinced recently that the corpse was that of their daughter, whom they thought had committed suicide. It was of course impossible to identify the body by ordinary means after it had been immured so long, but the girl's dentist was able to prove the identity by an examination of the teeth. This is only one of many similar cases which might be related.

In a recent number of the *Popular Science Monthly* Dr. A. H. Thompson contributes an article on the subject. He proposes a universal and standard plan of classification, and suggests the following list of dental and oral peculiarities:

- (a) Curve of arch, whether round, square or V-shape.
- (b) Width of arch, in centimeters—from outside surfaces of first upper molars.
- (c) Depth of vault, from grinding faces of molars.
- (d) Color and texture of gums, peculiarities of ridges in roof.
- (e) Size of teeth, whether large, small or medium.
- (f) Shape of teeth, whether wide or narrow, long or short, worn or not, etc.
- (g) Color of teeth, white or dark, yellowish, bluish, or modifications, etc. (This factor would be modified by time and habits, but the expert observer would estimate that.)
- (h) Irregularities of the teeth, as to being out of normal place, crowding and malpositions generally.

- (i) Teeth absent totally.
- (j) Fillings in teeth—noting positions on crown and materials employed.
- (k) Cavities of decay unfilled.
- (l) Diseased teeth, dead teeth, chronic abscess, etc.
- (m) Artificial teeth crowns—porcelain, gold, bridge teeth, etc.
- (n) Artificial teeth on plates.
- (o) Miscellaneous peculiarities—such as abrasion, pits or other congenital markings; lingual cingules; number of cusps on second lower bicuspsids, upper second molars, etc.; third molars, whether present or absent; forms of crowns, etc., and all abnormal forms of teeth, etc.

He says that this scheme is merely suggestive and would probably be improved by practice and experience, and that while many of the above characteristics are perishable and of value perhaps for only a limited time, others are of permanent durability. At a later examination an intelligent dentist would naturally make allowances for the perishable data, and the absence of some features would not necessarily mean lack of identity.

Life insurance companies need greatly some infallible system of identification after death. They are constantly expending large sums of money in fighting doubtful claims, all of which could be saved if they would make use of the only imperishable physical data—the teeth. Perhaps the reason why the companies have not appreciated the value to them of these organs is because the facts have not been brought to their attention. We would suggest that the National Dental Association appoint a committee to confer with the companies on this subject, and to submit a chart on the lines laid down by Dr. Thompson. He suggests that the dental data should be employed as a means of identification of soldiers and criminals as well. We will hope that some of the progressive men of the profession take up the work and carry it through to a successful issue.

Notices.

SANGAMON-MENARD COUNTY (ILL.) DENTAL SOCIETY.

The annual meeting of the Springfield (Ill.) Dental Society was held October 14, 1904, and the name was changed to the Sangamon-Menard County Dental Society. The following officers were elected: President, Edmund Lambert; First Vice-president, Edward Wall; Second Vice-president, H. E. Blane, Greenview; Secretary, E. F. Hazel; Treasurer, E. A. Kartack; Librarian, J. C. Williams, Illiopolis.

OKLAHOMA CITY DENTAL SOCIETY.

The Oklahoma City (Okla.) Dental Society was organized October 18, 1904, and the following officers were elected: President, F. H. Coulter; Vice-president, J. W. Grant; Secretary, C. G. Mitchell.

AKRON (O.) DENTAL SOCIETY.

The Akron (O.) Dental Society was organized October 7, 1904, and the following officers were elected: President, F. H. Lyder; Vice-president, J. B. Vedder; Secretary, T. F. Watters; Treasurer, J. W. Lyder.

SOUTHERN BRANCH NATIONAL DENTAL ASSOCIATION.

The eighth annual meeting of the Southern branch of the National Dental Association will be held February 21-23, 1905, at Memphis, Tenn.

J. A. GORMAN, Cor. Secy., Asheville, N. C.

WHITESIDE-LEE COUNTY (ILL.) DENTAL SOCIETY.

The Whiteside-Lee County Dental Society was organized at Sterling, October 20, 1904, and the following officers were elected: President, G. B. Dillon, Sterling; Vice-president, F. E. Morris, Dixon; Secretary and Treasurer, C. F. Sims, Sterling.

CENTRAL TEXAS DENTAL SOCIETY.

The Central Texas Dental Society was formally organized at Temple, September 24, 1904, and the following officers were elected: President, Pitt S. Turner, Belton; Vice-president, W. A. Sontag, Waco; Secretary and Treasurer, J. M. Murphy, Temple.

NORTHERN ILLINOIS DENTAL SOCIETY.

The Northern Illinois Dental Society held its seventeenth annual meeting at Sterling, October 12-13, 1904, and the following officers were elected: President, M. R. Harned, Rockford; Secretary and Treasurer, A. M. Harrison, Rockford. The next meeting will be held at Elgin.

COLORADO STATE DENTAL ASSOCIATION.

The Colorado State Dental Association held its annual meeting at Denver, October 13-14, 1904, and elected the following officers: President, B. A. McGee, Denver; Vice-president, H. L. Morehouse, Colorado Springs; Secretary, H. W. Bates, Denver; Treasurer, Wm. Smedley, Denver. The next meeting will be held at Colorado Springs.

MORGAN COUNTY (ILL.) DENTAL SOCIETY.

The dentists of Brown, Morgan, Pike, Cass and Scott Counties met in Jacksonville, October 8, 1904, and organized the Morgan County Dental Society. The following officers were elected: President, C. B. Sawyer, Jacksonville; Vice-president, W. B. McKinney, Barry; Secretary, W. B. Young, Jacksonville; Treasurer, J. L. Smith, Virginia.

KANKAKEE COUNTY (ILL.) DENTAL SOCIETY.

The dentists of Iroquois, Will and Kankakee Counties met at Kankakee October 21, 1904, and organized the Kankakee County Dental Society. The following officers were elected: President, A. C. Wuilleman, Kankakee; Vice-president, J. T. Leach, Onarga; Secretary, H. S. Scofield, Kankakee; Treasurer, D. P. Scott, Kankakee; Librarian, A. F. Switzer, Manteno.

ROCK ISLAND COUNTY (ILL.) DENTAL SOCIETY.

The Rock Island County (Ill.) Dental Society, embracing the counties of Rock Island, Henry and Mercer, was organized October 11, 1904, at Moline, and the following officers were elected: President, L. W. Skidmore, Moline; Vice-presidents, W. W. Moorehead, Aledo; J. E. West, Geneseo; L. Silvis, Rock Island; Secretary, J. W. Gluesing, Moline; Treasurer, R. M. Pearce, Rock Island; Librarian, H. G. Trent, Rock Island.

COLORADO STATE BOARD OF DENTAL EXAMINERS.

The regular semi-annual meeting of the Colorado State Board of Dental Examiners will be held in Denver, December 6-8, 1904. The examination will be both theoretical and practical, and applicants must be prepared to do such practical work as is required. All applications must be filed before December 6.

M. S. FRASER, Secy.,
407 Mack Blk., Denver.

KENTUCKY STATE BOARD OF DENTAL EXAMINERS.

The Kentucky State Board of Dental Examiners will meet in Louisville, December 6, 1904, for the examination of candidates desiring license to practice dentistry in this state. Candidates must be graduates of reputable dental colleges and application must be made to the Secretary fifteen days before examination.

C. R. SHACKLETTE, Secy.,
628½ Fourth Avenue, Louisville.

HARTFORD (CONN.) DENTAL SOCIETY.

At the annual meeting of the Hartford (Conn.) Dental Society, held October 10, 1904, the following officers were elected for the ensuing year: President, G. M. Griswold; Vice-president, C. E. Barrett; Secretary, A. E. Cary; Treasurer, E. R. Whitford; Executive Committee, E. H. Munger (Chairman), W. S. Youngblood, A. A. Hunt; Librarian and Curator, Hugh Dryhurst; Historian, Henry McManus.

A. E. CARY, Secy.

CENTRAL PENNSYLVANIA DENTAL ASSOCIATION.

The Central Pennsylvania Dental Association met at Tyrone, October 12, 1904, and elected the following officers: President, J. C. Nugent, Altoona; Vice-president, C. V. Mierley, Huntingdon; Secretary, Julia E. Wood, Altoona; Treasurer, H. E. Crumbaker, Altoona; Executive Council, F. B. Evans, Barnesboro; M. T. Dill, Huntingdon; T. Stine, Tyrone; W. M.

Bolger, Martinsburg; J. W. Carter, Altoona; Board of Censors, C. M. Bowles, J. W. Carter, L. M. Nugent, all of Altoona; Executive Committee, C. W. Brown and W. C. Wilson of Huntingdon.

NORTHEASTERN DENTAL ASSOCIATION.

The tenth annual meeting of the Northeastern Dental Association was held at Hartford, Conn., October 19-21, 1904, and the following officers were elected: President, Thos. Mound; First Vice-president, T. J. Barrett, Worcester, Mass.; Second Vice-president, F. E. Maxfield, Bangor, Me.; Secretary, E. O. Kinsman, Cambridge, Mass.; Asst. Secretary, Chas. F. Kreppel, Forest Hills, Mass.; Treasurer, E. B. Griffith, Bridgeport, Conn.; Librarian, Chas. H. Riggs, Hartford, Conn.; Editor, D. W. Johnston, New Haven, Conn. The next meeting will be held at Rutland, Vt.

SOUTH DAKOTA BOARD OF DENTAL EXAMINERS.

The South Dakota State Board of Dental Examiners will hold its next regular session for the examination of candidates at Sioux Falls, December 6, beginning at 1:30 p. m. All candidates are required to bring operative instruments and come prepared to do all kinds of clinical operative work, also to make a bridge of not less than four teeth, including one Richmond and one gold shell crown invested ready to solder. All candidates must send their application to the Secretary not later than December 2.

G. W. COLLINS, Secy., Vermilion.

UNION MEETING AT BASEL, SWITZERLAND.

A union meeting of the European Advisory Boards Association to the National Association of Dental Faculties, the Southern Section of the Centralverein in Amerika graduirter Doctoren der Zahnheilkunde (E. V.), the Swiss Association of American Dentists, and the Basler Zahnärztliche Gesellschaft, will be held in Basel, Switzerland, December 17-19, 1904. Programs will be issued early in November. The profession of Europe and America is cordially invited to attend and to contribute papers, exhibits and clinics.

L. C. BRYAN, President, Basel.

DENTAL CONGRESS IN PORTLAND IN 1905.

A dental congress will be held in Portland, Ore., in 1905. It will be composed largely of dentists in the territory embraced in the Lewis and Clark Country, west of the Rocky Mountains, but the attendance of eastern men and a full representation of dental manufacturers is particularly desired. A temporary committee from the states of Washington, Oregon and California has been formed, and similar committees will be appointed by various other western states. Railroad rates to the Pacific Coast next year will be exceedingly low, on account of the Lewis & Clark Fair, and in addition to the Congress being a gathering of intense professional interest we will endeavor to hold out to the eastern men a promise of a delightful and instructive vacation. Cheap and popular excursions will be made to the

Yellowstone Park, Southeastern Alaska, Puget Sound and the Yosemite Valley. Dentists and manufacturers from all parts of the country are cordially invited to attend.

ARTHUR W. CHANCE,

Secy. Temporary Committee, Portland.

News Summary.

W. C. MESSINGER, a dentist at Hartford, Conn., died suddenly Oct. 9, 1904.

C. B. COCKE, a young dentist at Jacksonville, Tex., died October 5, 1904.

C. R. THOMPSON, a dentist of Cleveland, died Oct. 27, 1904, of typhoid fever.

F. A. PHELPS, a dentist at South Norwalk, Conn., committed suicide Sept. 28, 1904.

W. M. GRIFFITH, a dentist at Atlantic, Ia., died October 14, 1904, of appendicitis.

W. F. DAVIS, a dentist at Lansing, Mich., died September 25, 1904, from typhoid fever.

J. E. BIENVENU, 56 years old, a dentist at St. Martinsville, La., died October 8, 1904.

C. A. HUGHES, a young dentist of Washington, died September 19, 1904, of typhoid fever.

A. H. BALDERSTON, 68 years old, a dentist of Baltimore, died October 9, 1904, of paralysis.

L. A. GEBHARDT, a dentist at New Ulm, Minn., was murdered in his office November 2, 1904.

E. L. HANN, a dentist at Denton, Tex., accidentally killed himself by shooting October 11, 1904.

A. C. STAMM, 27 years old, a U. S. Navy dental surgeon at Guam, died of tropical fever Sept. 23, 1904.

E. B. LONG, 57 years old, a dentist at West Pittston, Pa., died September 25, 1904, after a long illness.

W. C. HEPBURN, 44 years old, a dentist at New Rochelle, N. Y., died October 19, 1904, of heart disease.

B. O. CONRAD, 72 years old, a retired dentist at Nunda, N. Y., died October 4, 1904, following a stroke of apoplexy.

P. A. BOSWORTH, 48 years old, and for many years a practising dentist at Fitchburg, Mass., died September 30, 1904, at Lunenburg, Mass., after a long illness.

FLOSS SILK HOLDER.—A picture nail with porcelain button screwed on end makes a good holder for the spool of floss silk. Drive in point of nail at some convenient place, put on spool and screw on top. DRs. STANSBURY & ALEXANDER, *Hints*,

CORRECT BITE.—When taking bite in wax, tell patient to say "no more" when biting. Nine out of ten will then bite correctly.—DRS. STANSBURY & ALEXANDER, *Hints*.

SONG OF THE BUSY HUSBAND.—"Wives and daughters all remind us, We must make our little pile, And, departing leave behind us Cash for them to live in style."—*Tit-Bits*.

BAKING CROWNS.—Cut clay pipe-stems into one-half-inch lengths and use them to support pin crowns when baking in the furnace. They will stand the heat of any furnace.—G. B. SPEER, *Summary*.

GUTTA-PERCHA CONTRAINDICATED AS BASE.—Never insert a filling over a gutta-percha base, as it will most surely expand, and either move the filling or press on the pulp.—H. P. GRIFFITH, Indiana, Pa.

TO REMOVE OXID FROM GERMAN SILVER REGULATING APPLIANCES.—Hydrochloric acid, cold, full strength, may be used to remove oxid from German silver regulating appliances.—V. E. BARNES, *Summary*.

SYRINGING THE MOUTH.—It took years to teach me that in syringing the mouth the less one interferes with the free action of the muscles the less likely the water is to run out at the corners.—MARK G. McELHINNEY, *Review*.

FIRES.—R. E. Chafer, Miami, Fla., Sept. 15, loss \$600, insurance \$300.—E. L. Wetzel, Miami, Fla., Sept. 15, loss \$800, no insurance.—F. J. Boston, Lewiston, Idaho, Sept. 27, loss \$1,500, partially insured.—J. A. Leggett, McHenry, Miss., Sept. 27, loss \$300, partly insured.

SEALING A CAVITY WITH COTTON AND SANDARAC.—Cotton soaked in sandarac becomes very foul if left in a cavity for several days. If oil of cinnamon is added to the sandarac it will be much less objectionable. I often wonder why sandarac is not prepared in this way.—HOMER ALMON, *Review*.

PROXIMAL CAVITIES IN YOUNG TEETH.—In proximal cavities infringing upon the gums, two cavities in the same interproximal space, I would fill with gutta-percha and span across with a piece of metal to prevent the gutta-percha from impinging on the gums.—DR. R. J. WENKER, *Summary*.

FINAL FINISH ON RUBBER PLATE.—After doing all to the plate you intended to, take plaster of Paris and with a piece of tissue paper or your fingers rub the polished surface for about five minutes, and you who have not tried it will be astonished at the results.—DR. C. A. REEVES, Lamar, N. C., *Hints*.

PAIN FOLLOWING TOOTH EXTRACTION.—Fill the alveolus with a cotton tampon saturated in a solution of equal parts chloral hydrate, glacial phosphoric acid and glycerin, and the pain will disappear. Besides its pain-relieving properties this dressing is a powerful antiseptic.—*Rev. de Dent. Appliquée*.

SICKNESS AFTER CHLORID OF ETHYL.—The smell of vinegar appears to have a very deterrent effect. At home I wipe a little ordinary malt vinegar on the upper lip immediately the extraction is finished. At the hospital I use dilute acetic acid with the same effect.—H. JAS. MORRIS, L. D. S., Eng. C. A. S. *Circular*.

PERFECT PATIENT.—Most of our patients are a good deal what we make them. We will rarely have trouble with the patient if we have no trouble with ourselves. The ideal dentist will control his patients because he will control himself. They will have confidence in him and submit perfectly to him.—J. V. CONZETT, *Review*.

THEY, TOO, WERE THANKFUL.—J. Arthur Thompson, in his "Study of Animal Life," says: "Marcus Aurelius gives thanks in his roll of blessings that he had not been suffered to keep quails; so Darwin, in recounting his mercies, does not forget to be grateful for having been preserved from the snare of becoming a specialist."

CEMENTING ON BANDS IN REGULATING CASES.—In putting on bands the teeth should be smeared with cement as well as the bands; this is imperatively necessary to prevent the devitalization of the teeth on which the appliances are placed. Too much care cannot be taken in regard to this.—DR. C. F. ALLAN, *International*.

ROOT-CANAL FILLING.—After pulp extirpation wipe out canal with cotton dipped in a saturated solution of thymol in oil of cinnamon; fill canal with gutta-percha points dipped in the same solution. The oil of cinnamon evaporates, leaving the thymol in crystals along the walls of the root, forming with the gutta-percha points a very lasting antiseptic.—J. J. E. DE VRIES, *Items*.

SOAP YOUR CASTS.—I recently noticed an item in one of our journals, setting forth a method of keeping plaster from adhering to a vulcanite plate. The author's plan was to burnish tin foil on the model and then soap the foil. A more perfect fit can be secured by not using the foil. Secure good hard casts and then soap them. The plate will not show the gloss and will fit perfectly.

HOT WATER IN THE TREATMENT OF PYORRHEA.—Hot water is very beneficial in the treatment of pyorrhea alveolaris, and I doubt if much else is needed often in the cleaning of the pockets. I keep a thermometer in the distilled water, keeping the latter between 135 and 145 degrees; if you go to 150 it will scald; and I do not let it drop below 130 degrees. DR. CRENSHAW, *Trans. Miss. Dental Assn.*

DIVORCES.—Isidore De Johns, a dentist of Cincinnati, has been sued for divorce by his wife, who alleges non-support.—Chas. E. Lancaster, a dentist of Oakland, Cal., has brought suit for divorce against his wife.—Eli S. Straub, a dentist of Sioux City, Ia., has secured a divorce from his wife, alleging cruelty.—J. F. White, a dentist of Kansas City, Mo., has been sued for divorce by his wife, who alleges desertion and non-support.

FATALITIES.—Oct. 19, a woman at Wabash, Ind., died under the influence of chloroform, administered by a physician, which was given prior to the extraction of some teeth.—A young woman of Escanaba, Mich., died in a dentist's chair Oct. 25, from shock occasioned by the extraction of twelve teeth.—Oct. 4, a man at Marysville, O., died from a growth in the mouth which physicians said was caused by a tooth which had been broken off in an effort to extract it.

EXAMINING BOARD AFFAIRS.—At the last meeting of the Michigan Board six out of eleven applicants were successful in passing the examination.—At the recent meeting of the Minnesota Board fourteen applicants took the examination and six passed.—Oct. 7, the Utah Board elected the following officers: President, A. S. Chapman; Vice-president, W. G. Dalrymple; Secretary and Treasurer, H. W. Davis.

HE PAID NEXT DAY.—"Can you tell me what sort of weather we may expect next month?" wrote a subscriber to the editor of a country paper, and the editor replied as follows: "It is my belief that the weather next month will be very much like your subscription." The inquirer wondered for an hour what the editor was driving at, when he happened to think of the word "unsettled."—*Stray Stories*.

THE TONGUE.—Eyeless, yet comprehending; helpless, but cunning and skilful as a magician; voiceless, but the very creator of language; long or short, thick or thin, fat or lean at will; without joints, yet as rigid as iron, or as pliable as water, the tongue, at least to the dentist, is an unruly despot, contending with us for the occupation of every spot or place and always in the way.—G. E. T. WARD, *Cosmos*.

EXPOSURE TO RADIUM.—Dr. Roux of the Paris Pasteur Institute presented a paper detailing the results of exposing mice continuously to the action of radium. He hung a tube of radium in a cage containing mice, and after twenty days they lost their fur, which subsequently came out again, but was white. Exposure for a still longer period resulted in the production of a general muscular paralysis.—*Lancet and Clinic*.

ATAVISTIC.—I wish I had lived in the good old days,
Before men lost all their monkey ways;
When they sat in the trees and scratched for fleas,
And wore no trousers to bag at the knees.
A much better way than we have to-day,
When everybody's so bloomin' blasa.—*Life*.

PRECISE.—Not that he wished to increase the dog tax, but rather to keep man's most faithful friend out of the pound, was the motive that prompted the young son of a dental friend to forward to the city clerk the following self-explanatory communication: "Please find herewith one dollar for a suitably inscribed tag for one pup, Bruce by name, half fox-terrier, the other half dog, residing for the present at 72 Blank street, and the property of Johnnie Blink. Yours truly." Both halves were duly registered and appropriately tagged.—*D. O. & L.*

DRY HEAT TO SUBDUE RHEUMATIC PAIN.—Another simple and effective means of applying dry heat, particularly to joints and surfaces, is afforded by sand, which is loosely inclosed in a flannel bag with linen lining, baked in an oven, and closely packed round the part. The effect lasts for half an hour, and is both comforting and curative in chronic joint affections and lumbago or muscular rheumatism. On a more extensive scale the subjects of rheumatoid arthritis in Egypt spend hours buried in the hot sand with remarkable benefit.—*Therapeutic Gazette*.

HYGIENE OF THE GUMS.—To have good, satisfactory, masticating teeth the gums must receive friction, through the food in eating or through rubbing in some manner to insure perfect circulation. Teeth without gums are denuded teeth, and in many cases they are useless teeth. I look upon the proper care of the gums from the personal standpoint of as much importance as the care of the teeth themselves.—A. W. HARLAN, *Items*.

BURCHARD'S DENTAL PATHOLOGY.—New (2d) Edition. A Text-Book of Dental Pathology and Therapeutics. Being a Treatise on the Principles and Practice of Dental Medicine. By the late Henry H. Burchard, M. D., D. D. S. New (2d) edition, thoroughly revised by Otto E. Inglis, D. D. S., Professor of Dental Pathology and Therapeutics at the Philadelphia Dental College. Octavo, 650 pages, with 450 engravings. Cloth, \$5.00, net; leather, \$6.00, net.

CROWNING LIVE TEETH.—It has been my practice for many years to use a crown with band and without post in anterior teeth whenever devitalization has not been effected, for the reason that in all cases where it can be done upon the live stump the danger of the band coming into sight after a year or two does not exist; it is only the devitalized root that lengthens in that way, and especially in the mouths of patients of mature years.—GEO. F. GRANT, *International*.

SOLDERING ALUMINUM.—A very good solder for aluminum and one which will not undergo rapid change in the mouth may be made as follows:

R Aluminum, 60 parts;

Zinc, 10 parts;

Phosphor-tin, 30 parts.

A flux that works very well with this solder is stearic acid, or common stearin.—E. BUMGARDNER, *Western*.

MAN WITH A DIRTY MOUTH.—A man who commits suicide may rid the world of a nuisance, but a man with a mouth full of pus and decay fills the world with a nuisance, puffing into the nostrils of his associates contamination, disease and stench. If suicide be a crime, so is denticide. I have taken the liberty of coining the word "denticide" for wilful self-destruction of the teeth through neglect, and I pray you, gentlemen, its adoption. I had rather live within the sound and scent of a merry, bubbling sewer than absorb the air laden with the evacuations of the oral cavity of such a man.—Dr. Ward in *Cosmos*.

SAVE YOUR WORN SCREW MANDRELS.—The threads of the ordinary screw mandrels become worn very quickly. These old mandrels can be easily made useful for carrying carborundum wheels of various sizes by smearing sealing wax over the exposed end of the screw after the wheel has been placed upon it, and while the wax is hot forcing it into the socket of the mandrel with a strong screwdriver. The shank can be held in a vise or a pair of pliers while the screw is being forced into it and after the wax becomes cool it will be found to hold securely. Fibers of cotton wrapped around the screw will sometimes hold when the operator is in a hurry.—*Review*.

VETERAN DENTIST HONORED.—Tuesday evening, October 18, 1904, Dr. C. T. Stockwell, one of the oldest practising and best-known dentists of New England, was tendered a banquet by 65 of his friends, dentists predominating, at Springfield, Mass., his home. Speeches were made and toasts were given by Drs. A. J. Flanagan, Clinton W. Strang, A. E. Dolbear, C. G. Whiting, John F. Dowsley, Newton Morgan, G. A. Maxfield, Waldo E. Boardman, Edgar O. Kinsman, James McManus and others.

COCAIN AND ADRENALIN.—The addition of three to four drops of adrenalin to 100 ccm. of a 0.01 per cent cocain solution makes the latter more efficient than a 0.1 to 0.2 per cent solution without the addition. For tooth extraction Braun (Berl. Klin.) employs a solution of 1 to 1½ cg. cocain in 1 to 2 ccm. salt solution, with the addition of two or three drops of adrenalin; half injected in front of and half behind the tooth to be extracted, at the level of the root as near the periosteum as possible.—*Brit. Med. Jour.*

PSYCHICAL PHENOMENA DUE TO TEETHING.—At a meeting of the Society of Hypnology and Psychology M. Demonchy (*Brit. Dent. Jour.*) described the case of a child who suffered from excitement, nervous attacks, fits of passion and violence, and an irresistible impulse to use foul and abusive language in response to questions. The diagnosis of meningitis was made and a fatal termination was expected. In reality the peculiar mental condition of the child depended on trismus and buccal infection due to the appearance of the first molar. Treatment directed to the buccal infection cured the trismus and the normal mental condition was restored.

FAITH ASSERTED ITSELF AGAIN.—The dentist had just trimmed a cusp that impinged on a recently-placed crown, when the patient, a man of exceptional intelligence, asked, "Will not that injure the enamel, Doctor?" "Not a bit." "But I thought enamel was for the protection of other parts of the tooth." "True; but practically it is of small consequence on these points if the teeth are of good structure; cusps on human teeth, like teeth generally of the dog, are self-cleansing—cleansed by use." Then after a few minutes' reflection this rare patient added, "Hear me! The idea of asking you, a dentist, if what you are doing to my teeth will not injure them;" and a moment later, "as if it were a part of your professional duties to damage one's teeth! Ridiculous!"—*D. O. & L.*

NEW APPLICATION OF SOFT OR VELUM RUBBER.—(Joaquin Plet, *La Odontologia*). In the class of cases where the two cuspids may be the only remaining teeth, with large crowns and narrow necks, the close adaptation of hard rubber in a denture around these teeth becomes impossible. The case is then flaked and the wax removed in the ordinary way. The plaster teeth may have been previously trimmed slightly, then completely encircled by packing liberally the soft rubber. Around this is then packed the rubber ordinarily used, when the case is vulcanized as usual. Care should be observed in finishing not to use scrapers or files, but a sharp knife, with both the knife and rubber wet. Some little force will be required to press the plate to place, when a snug adaptation will be attained, offering support to the plate superior to clasps and less harmful to tooth structure.—P. B. McCullough, *International*.

GENERAL ANESTHESIA CONTRAINDICATED IN THE PRESENCE OF DYSPNEA.—In very severe dyspnea general anesthesia is usually contraindicated, for the reason that it abolishes the activity of the voluntary muscles of respiration and hence may cause suffocation. In these cases the carbonic-acid poisoning is often sufficient to lessen sensibility to a great extent, so that rapid operations can be done with very little pain. Otherwise local anesthesia should be employed.—*Intern. Jour. of Surg.*

REPAIRING FRACTURED CASTS.—A valuable method of repairing fractured plaster casts may be found in the use of celluloid dissolved in camphor and ether to a creamy consistence. A good quality of celluloid should be selected, and to it should be added a mixture of equal parts of ether and spirits of camphor. This combination dissolves celluloid rapidly, and should be added to the material until a solution of a creamy consistence is obtained. The preparation should be kept tightly corked to avoid its evaporation. When it becomes desirable to repair broken casts, the fragments to be attached should be well dried and both surfaces freed from broken particles. The surfaces should be coated with the celluloid solution, and after being pressed firmly should be allowed to dry. S. M. WEEKS, *International*.

FINISHING GOLD FILLINGS.—Many a young man has wondered why his filling did not finish up like that of some excellent operator whose work he has admired. Tell him that it is not that his ideal operator is so much more skilful than he, but because he got tired out too soon, and failed to appreciate that all that was needed to make his filling finish perfectly was two or three large pieces of gold, covering the whole surface of the filling like a blanket, carefully laid on with a broad, flat, almost smooth-faced plugger; this to be followed by a very small point with which the surface is condensed. Tell him also for his encouragement that his ideal operator has not skill enough to put a perfect filling in the cavity where he failed yesterday, with no more room than he had. It is not that his ideal is so much more expert as a mechanic; it is that he knows that to fill the cavity perfectly he must have room, and without it he will not attempt the task.—F. MILTON SMITH, *International*.

IDEAL WAY OF TEACHING.—There is but one ideal way of teaching, and that is to study the individuality of your student and teach according to its demands. If I were rich enough I should create a fund for that purpose, and prove to you results such as Froebel has given to the world in his kindergarten system. I never have and never will permit any difference of infirmary practice from my method of didactic teaching. Dentistry is not a very broad profession, but it certainly permits numerous ways of execution. It is utterly impossible, without confusing the minds of beginners, to teach definitely more than one system, and that should be one based on successful and progressive methods. Other operative methods should be alluded to, and teaching should thus be cosmopolitanized, but neither the mind nor the hand of a student should be allowed to wander in all directions without a positive method, which must prove the foundation of all possible future ramifications.—R. H. HOFHEINZ, *Items*.

BE ETHICAL.—Recently I saw two advertisements from dentists, who are really not bad fellows, and yet they choose to exclude themselves from the company of decent men by resorting to that which not only lowers them in the estimation of truly professional men, but degrades dentistry in the eyes of the public. These men probably did not stop to think of the sweeping effect their methods would produce upon their own calling in later years, and it would be well for those whose minds are inclined in that direction to think of the result before resorting to such methods.—A. W. THORNTON, *Review*.

THIS IS THE LIMIT.—An advertising dentist in Kansas City, Mo., sent out two men to drum up trade. A woman in Kansas City, Kan., alleges that one held her in a chair, while the other extracted six teeth, all but one of them being sound, and then forced her to pay for the work. One of the "dentists" says that he extracted one tooth free of charge to advertise his employer's "system," and that the woman agreed to pay for the extraction of the rest of the teeth. Regardless of which one is telling the truth, wouldn't that make an ethical dentist proud of his profession—extract one tooth free of charge, and then have the rest out if you like the sample.

VERY COMPLIMENTARY.—Accept best wishes for the continued success of your superb journal. P. J. Friedrichs, New Orleans.—I cannot get along without the Digest, and I consider it the best dental journal published. E. W. Pittman, Tabor, Ia.—The Digest is a most excellent journal. E. L. Read, Baltimore.—I take six journals, and value the Digest more than any of them. H. W. McIntire, Red Wing, Minn.—I could not get along without the Digest. T. N. Shattuck, Belleville, Wis.—The value of the Digest is, unquestioned. J. H. Hanning, New York.—The Digest is a most excellent publication. D. T. Smithwick, Louisburg, N. C.—I like the Digest. J. E. Armitage, Racine, Wis.—I read the Digest with great interest. A. H. Brockway, Brooklyn.—I appreciate the Digest very greatly. George L. Shepard, Sedalia, Mo.—I like the Digest. T. M. Lynn, Los Angeles.—The Digest comes along regularly and is much appreciated. Robt. S. Ivy, Shanghai, China.—I can't get along without the Digest. S. B. Cook, Chattanooga, Tenn.—The Digest is the best of its kind. D. M. Cattell, Nashville, Tenn.

SEALING ARSENICAL APPLICATIONS INTO CAVITIES DIFFICULT OF ACCESS, OR EXTENDING BEYOND GUM MARGIN, OR BOTH.—By R. E. Sparks, Kingston, Ont., in *Dominion*. Prepare the cavity margins for permanent fillings. If gum hemorrhage ensues, pack with cotton saturated with adrenalin chlorid, while preparing application and filling. When everything is ready, remove cotton, syringe cavity with warm water, lay in a piece of asbestos felt about large enough to cover the floor of the cavity, cover the cervical wall of cavity with amalgam until the filling reaches beyond gum margin, press the asbestos felt away from the floor of the cavity, and place the application in position. Press back the asbestos felt over the application, and fill the balance of the cavity. When it is desirable to remove the pulp, drill down behind the filling, extending the cavity sufficiently to admit of direct access to the pulp

canals, or if sufficient enamel wall exists between the filling and the point directly over pulp chamber to warrant it, open through the fissures without regard to the filling. This method protects the gum from action of arsenic and simplifies the after-treatment.

ACTION OF ADRENALIN ON THE BLOOD. M. Loeper and O. Crouzon (*La Tribune Médicale*) find that the ingestion or the injection of adrenalin produces certain effects on the blood, some of which are the following: Hyperglycemia, diminution of the blood ferments, first increase and then diminution of the number of red corpuscles, and lowering of the amount of hemoglobin. The number of the hematoblasts is greatly raised; leucocytosis is as a rule very marked, especially when Addison's disease is present, or when the capsule has been removed. This leucocytosis is at first polynuclear, but rapidly becomes lymphoid with slight eosinophilia.

ACCIDENTS.—W. J. Carroll, a dentist in Haughville, Ind., was struck by a switch engine Sept. 25, and badly hurt. An aged woman in Des Moines, Ia., was taken from a dentist's office Sept. 23 in a dangerous condition from hemorrhage and shock, resulting from the extraction of a number of teeth. She recovered after a few days in the hospital.—A. J. Mueller, a dentist in Waterloo, Ia., was severely scalded Sept. 29 by steam when he poured cold water on a heated vulcanizer.—O. P. Howe, a dentist at Clay Center, Kan., was severely injured Oct. 5 by the explosion of a vulcanizer, and it is feared that he may lose the sight of one eye.—B. G. Pierce, a dentist of Oregon, Mo., wounded his hand severely on a broken bottle Oct. 3. Blood-poisoning set in and he had to go to the hospital, but is now recovering.—Oct. 11, L. Weigel, a dentist at Rochester, N. Y., had to have his right hand and three fingers of his left amputated because of blood-poisoning.—Oct. 3, a young woman in the office of S. D. Friedman, a dentist of Milwaukee, had chloroform administered by a physician prior to the extraction of some teeth. Before the anesthetic took effect she became violent, and the dentist was badly cut by the rings on her hand during the struggle to restrain her.

ILLEGAL PRACTITIONERS.—As stated last month, a man at Los Angeles was arrested Sept. 22 for practising dentistry without a license. He was fined \$150, but escaped payment because the complaint simply charged him with practising dentistry without a license, and the court held that the complaint should have been specific, and that the board must prove that he advertised and actually did work.—Sept. 16, a man was fined \$100 and costs at Greeley, Colo., for practising dentistry without a license.—Oct. 1, two dentists of Victor, Colo., were fined \$200 and \$100, respectively, for practising dentistry without a license, but the court remitted the fines on the promise of the men not to do so again.—Oct. 11, a dentist at St. Paul was fined \$20 for practising without a license.—Oct. 19, a dentist in New York was arrested for practising dentistry without a license. He resisted arrest, so now has two charges against him.—Sept. 19, a man was fined \$50 at Columbus, O., for practising dentistry without a license. He has appealed the case.—Oct. 8, four dentists at Altoona, Pa., were convicted of practising

dentistry without having passed the board examination.—Sept. 14, a man at Memphis, Tenn., was indicted by the grand jury for having charge of a dental office without being registered.

DAMAGE SUITS.—A Chicago dentist some time ago sued a tenant for rent, and at the trial a verdict considerably less than the amount of his claim was rendered. Now the tenant is suing the dentist for \$10,000 damages for alleged injury to his reputation.—A woman in Denver, Colo., has sued a dentist for \$5,000 damages for alleged unskillful treatment.—A woman in Baltimore telephoned a saloon-keeper, asking him to call to the 'phone a dentist who had an office next door. The saloon-keeper replied that the dentist was not in a condition to do business, as he had been drunk and asleep in his saloon for three or four hours. Now the dentist is suing the saloon-keeper for \$5,000 damages for defamation of character.—A woman in St. Louis is suing the proprietor of a dental parlor, alleging that when she went to him to have an aching tooth extracted he pulled four.—A young woman at East Orange, N. J., has obtained a verdict of \$5,000 against a dentist of that city for breach of promise.—A woman in New York City is suing a dentist, alleging that he borrowed \$2,000 from her, and is now about to go into bankruptcy.—A woman in Philadelphia is suing a dentist for \$1,000 damages, alleging that he treated her teeth in an unskillful manner.—A man in Pittsburg is suing the proprietor of a dental parlor for \$1,000 damages, alleging that blood-poisoning set in after he had a tooth extracted in that office.

MARRIAGES.—John Cardman, a dentist of Louisville, Ky., was married to Miss Lilian Orr of Louisville, Oct. 2.—B. F. Copp, a dentist of Albuquerque, N. M., was married to Miss Essie Abraham of Silver City, N. M., Oct. 7.—Fred Doolittle, a dentist of Mansfield, O., was married to Miss Bessie McIlheney of Norwalk, O., Sept. 18.—E. E. Elliott, a dentist of Lyons, N. Y., was married to Miss Frances I. Cady of Boonville, N. Y., Oct. 12.—C. B. Emery, a dentist of Marion, O., was married to Miss Lois Keaser of Napoleon, O., Oct. 12.—O. M. Flinn, a dentist of Marion, Ind., was married to Miss Emma T. Stout of Marion, Oct. 12.—W. F. Gates, a dentist of Jackson, Mich., was married to Miss Lena Hoffman, Oct. 5.—P. T. S. Hill, a dentist of Cincinnati, was married to Miss Clara Wolfe of Cincinnati, Sept. 21.—Fred Hoffer, a dentist of Lorain, O., was married to Miss Luella Hard of Preston, Minn., Oct. 17.—B. J. Keenan, a dentist of Butte, Mont., was married to Miss Clara McDonell of Detroit, Oct. 13.—Leon Marshall, a dentist of Columbus, O., was married to Miss Josephine Swartz of Columbus, Sept. 18.—W. C. Machen, a dentist of Pittsburg, was married to Miss Ella J. Paterson of Pittsburg, Oct. 1.—Robt. I. Moore, a dentist of San Francisco, was married to Miss Ethel Murray of San Rafael, Cal., Sept. 21.—O. P. Muckley, a dentist of Huntington, Ind., was married to Miss Mayme Luder of Huntington, Sept. 26.—C. F. Pierce, a dentist of Newtown, Pa., was married to Miss Mae S. Remington of Philadelphia, Sept. 28.—B. C. Smith, a dentist of Madisonville, Tex., was married to Miss Ethel Campbell of Anderson, Tex., Oct. 5.—Frank C. Swift, a dentist of New

Haven, Conn., was married to Miss Rosemary Healey of New Haven, Sept. 26.

DOG DAYS.—Dese Dog Days am curus days.

Dey cum de las of summer,
Like ooman wid er flity ways,
Am good, er bum, er bummer.

Jes es de fus happins ter be,
De fortys boun ter foller,
Dry es powder er wet es sea,
Hits open yer shut or tun up coller.

One yere hits cottin dats hoped.
Wen dry an hot, hit grows,
Nex yere wid rus hits doped,
But cawn spreads cross de rows.

And so tis wid tings een life,
Good fer one, bad fer anurrer.
Pese an ese or rassel an strife
Wile hoin yer row er plowin yer furret.

B. H. TEAGUE, *Hints*.

ROBBERIES.—Mary L. Warren, Hartford, Conn., Oct. 1, \$40.—W. H. Boone, Champaign, Ill., Sept. 14, \$20.—Oct. 18, a considerable amount of gold and other material was stolen from a dentist at Mt. Carmel, Ill.—Martin Bros., Muncie, Ind., Oct. 6, \$60.—G. H. Clay, Indianapolis, Oct. 20, \$65.—A thief is robbing the dental offices in Indiana. He pretends to be a solicitor for business and professional cards, and in this way obtains entrance to the offices and "sizes them up." An office at Frankfort was robbed of a large amount of material early this month, and it is thought this man did the job.—J. H. Floore, Shelbyville, Ky., Oct. 4, \$150, by a sneak thief.—Sept. 26, about \$200 worth of stuff was taken from the offices of several dentists at Adrian, Mich.—Sept. 25, Drs. Chadwick, Winchester and Howlett, Jackson, Mich., lost about \$210 worth of material.—Sept. 24, M. B. Dennis and J. C. Hart of Port Huron, Mich., lost about \$85 worth of gold.—A sneak thief is operating in St. Louis, and has taken small amounts from several offices. In one he secured the purse of a woman patient, who had left it on the table in the reception room.—Frank P. Quinn, Reno, Nev., Oct. 1, \$400.—L. Arndt, a dentist of Jersey City, reports that someone has stolen his diploma, which was granted by the New York College of Dentistry.—P. R. Jackson, Elyria, O., Sept. 23, \$60.—Sept. 26, the office of a dentist at Loraine, O., was robbed of a considerable amount of material.—J. G. Foltz, Canton, O., Sept. 23, \$20.—A woman is robbing the offices of dentists in Philadelphia of bric-a-brac and paintings. She is well dressed, so arouses no suspicion while sitting in the reception room.—Oct. 21, a man was arrested in Philadelphia just after having stolen some instruments from a dentist's office.